

# This PDF file contains the appendixes to U.S. Geological Survey Water-Resources Investigations Report 98-4049

Relations of Surface-Water Quality to Streamflow in the Hackensack, Passaic, Elizabeth, and Rahway River Basins, New Jersey, Water Years 1976-93



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### RELATIONS OF SURFACE-WATER QUALITY TO STREAMFLOW IN THE HACKENSACK, PASSAIC, ELIZABETH, AND RAHWAY RIVER BASINS, NEW JERSEY, WATER YEARS 1976-93

By Debra E. Buxton, Kathryn Hunchak-Kariouk, and R. Edward Hickman

U.S. Geological Survey

Water-Resources Investigations Report 98-4049

# **APPENDIXES**

Prepared in cooperation with the

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

West Trenton, New Jersey 1998



### **Description of Appendixes**

Appendixes 1-18 illustrate the relations of surface-water quality to streamflow by constituent for each station with three graphs. The first graph shows the relation of concentration to streamflow. Plots of concentration to streamflow indicate how instream constituent concentrations vary with streamflow, but do not indicate the relative contributions of constant and intermittent sources. Data for stations on streams that drain developed areas show greater scatter, especially for inorganic constituents such as sodium, chloride, and hardness. Relations between concentration and streamflow were developed by using (1) all measurements, (2) only measurements collected during the growing season, and (3) only measurements collected during the nongrowing season. Growing-season measurements are shown with open symbols, and nongrowing-season measurements are shown with crisscrossed, shaded symbols. Different symbols are used to show uncensored and censored values. For each group of measurements, the number of observations and values of slope and intercept are listed, and a regression line is shown when the slope of concentration to streamflow is different from zero at the 0.05 significance level. A seasonal dependency is indicated when the relations of concentration to streamflow for the growing- and nongrowing-season measurements are different. The 75th and 25th percentiles of the flow duration also are indicated.

The second graph shows the relation of load to streamflow. The regression slope of load to streamflow indicates the relative contributions of constant and intermittent sources to the instream load. The steeper the slope, the greater the contribution during increased streamflow from storm runoff (intermittent sources). Relations between load and streamflow were developed using all measurements. Different symbols are used to show uncensored and censored values. The number of observations and values of slope and intercept are shown, and a regression line is drawn when the slope is different from zero at the 0.05 significance level. A smoothed relation between load and streamflow is shown when there are 10 or more observations. The 75th and 25th percentiles of the flow duration also are indicated. The relations of load to streamflow for dissolved oxygen at saturation and fecal coliform bacteria are not shown because loads are not calculated for these constituents.

The third graph shows the trends in concentrations during high and low flows. Trends in constituent concentrations during high and low flows can indicate changes over time in the contributions from intermittent and constant sources, respectively. Positive trends during high flows indicate an increase in the storm runoff contributions over time, whereas negative trends indicate a decrease in the storm runoff contributions. Positive trends during low flows indicate an increase in the contributions from point sources and ground water over time, whereas negative trends indicate a decrease in the contributions from point sources and ground water. Measurements during low flows are shown with open symbols, and measurements during high flows are shown with crisscrossed, shaded symbols. Different symbols are used to show uncensored and censored values. The numbers of observations and water years during which at least one measurement was made are shown for each group of measurements. Trends are indicated by regression lines and slope values when the seasonal Kendall tau value is significant.

## **Navigation Tips**

1. Start at page 5 of the PDF file. This page lists the appendixes and the constituents they describe.

# Appendixes–Relation concentration and load trends in concentra

Appendix 1 ------ Alkalinity

Appendix 2 ----- Hardness

Appendix 3 ----- Total organic carbon

Appendix 4 ----- Suspended sediment

Appendix 5 ----- Dissolved solids

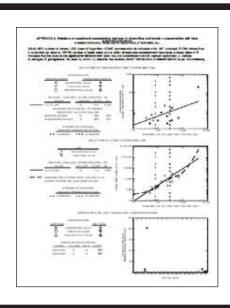
2. Move the cursor to the name of the desired constituent and click the mouse button to jump to the selected appendix.

A list of stations will appear.

### Appendi Fraction of dissolved ox

Station number	Station name
01377000	Hackensack River at River
01379000	Passaic River near Millin
01379500	Passaic River near Chatha
01380500	Rockaway River above Res
01381200	Rockaway River at Pine Br

3. At the station list, select the desired station, move the cursor to the station, and click the mouse button to jump to the data.



# Appendixes–Relations of constituent concentration and load to streamflow and trends in concentration with time

Appendix 1 Alkalinity
Appendix 2 Hardness
Appendix 3Total organic carbon
Appendix 4 Suspended sediment
Appendix 5 Dissolved solids
Appendix 6 Dissolved sodium
Appendix 7 Dissolved chloride
Appendix 8 Dissolved oxygen
Appendix 9Fraction of dissolved oxygen at saturation
Appendix 10 Total phosphorus
Appendix 11 Total nitrogen
Appendix 12 Total nitrate plus nitrite
Appendix 13 Total nitrite
Appendix 14 Total ammonia plus organic nitrogen
Appendix 15 Total ammonia
Appendix 16Total boron
Appendix 17 Total lead
Appendix 18 Fecal coliform bacteria

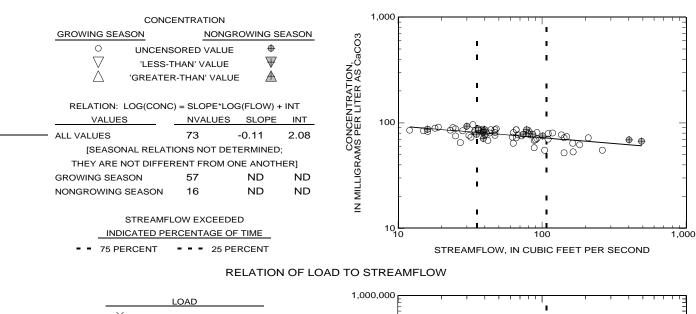
# Appendix 1 Alkalinity

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         73         0.89         2.81	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	10,000 = 10,
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	1,000 10 100 1,000 1,000 STREAMELOW IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

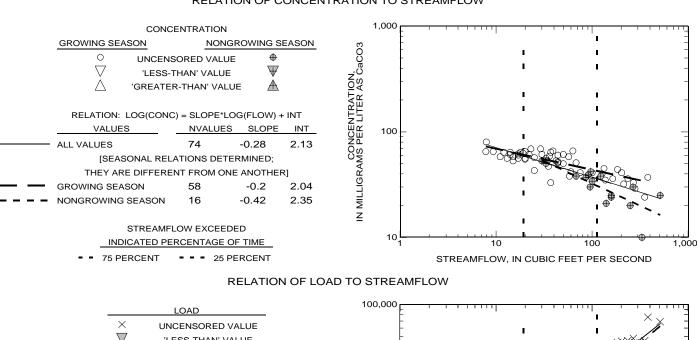
CONCENTRATION	100	
LOW FLOW HIGH FLOW O		
○ UNCENSORED VALUE	80	
☐ YLESS-THAN' VALUE ☐ Y ZO Y		
☐ 'GREATER-THAN' VALUE ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		•
TRENDS IN CONCENTRATION	60	
VALUES NVALUES NWYS SLOPE OU		₩ ₩
LOW FLOW	40	_
HIGH FLOW 14 7 ND S		
G.		
N MILLIG	20	-
-	0	
	U	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

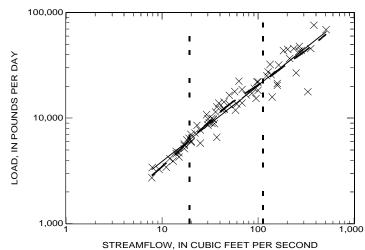


'LESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT NVALUES SLOPE **VALUES** ALL VALUES

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

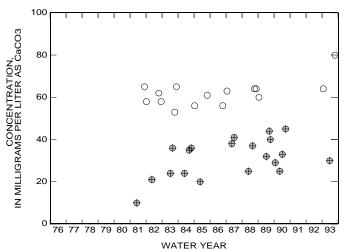
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
	GREATER-THAN' VALU	e 🕭

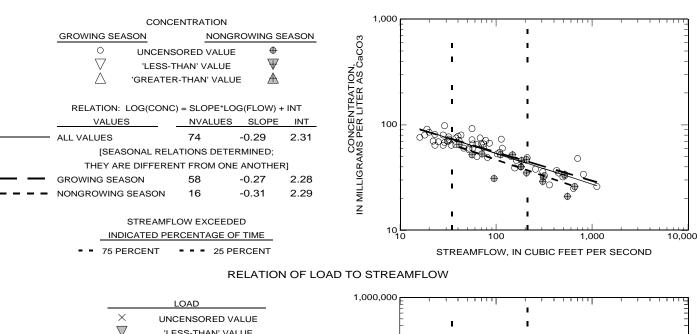
TRENDS IN CONCENTRATION						
VALUES	NWYS	SLOPE				
LOW FLOW	15	9	ND			
HIGH FLOW	20	10	ND			



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



'LESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

VALUES NVALUES SLOPE INT

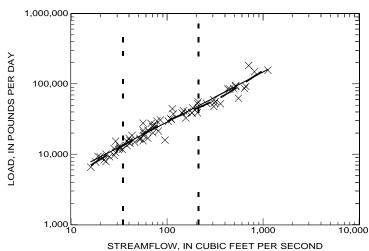
ALL VALUES 74 0.71 3.04

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

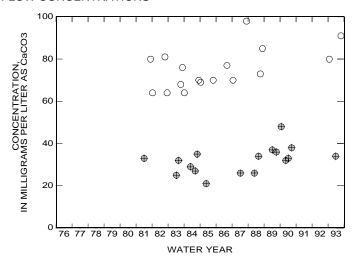
75 PERCENT - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION							
LOW FLOW	<u>H</u>	IGH FLOW					
0	UNCENSORED VALUE	<b>+</b>					
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$					
<u> </u>	GREATER-THAN' VALUE	$\triangle$					
		₩ .A					

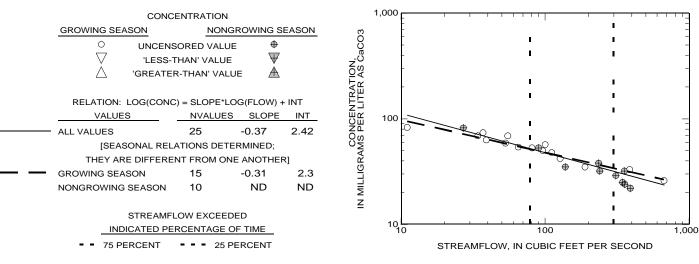
TRENDS IN CONCENTRATION							
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	17	9	ND				
HIGH FLOW	17	9	ND				



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



### RELATION OF LOAD TO STREAMFLOW

×	LOAD UNCENSORED VALUE 'LESS-THAN' VALUE	<u> </u>	100,000		
RELATION: LOG(	(LOAD) = SLOPE*LOG(FL	OW) + INT	Ä.	X	1
VALUES	NVALUES SLC	PE INT	8		
ALL VALUES	25 0.6	3.15	Ω N 10,000 –	•	
	ON BETWEEN LOAD AND ARE 10 OR MORE VALUE:		D, IN POL	<u>'</u>	! !
STRE	EAMFLOW EXCEEDED		0.	•	-
INDICATE	ED PERCENTAGE OF TIM	IE_	_	•	Ī
75 PERCE	NT = = = 25 PERCE	NT		ı	i
			1,000	100	1.
				STREAMFLOW, IN CUBIC FEET F	PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

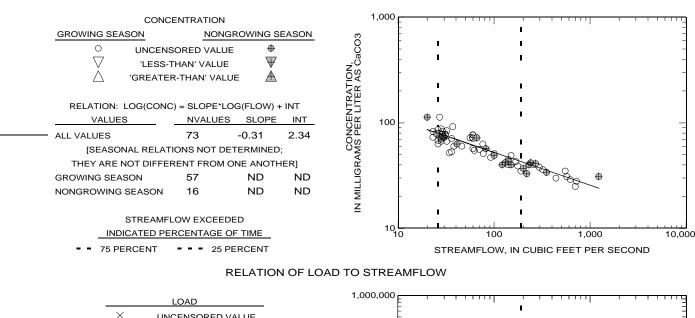
CONCENTRATION			.00	'	1 1	1	1		'	'	1		' '		'			
LOW FLOW	HIGH FLOW	Ö																
UNCENSORED VALUE	<u>+</u>	ION, AS CaCO3	80	_												С	)	0
'LESS-THAN' VALUE	À	NO VS (								0								
	$\triangle$	R A									_					0		0
		CONCENTRAT	60	_						(	0							_
TRENDS IN CONCENTRATIO		N L									0							
	SLOPE	SE																
LOW FLOW 8 5	ND	ညွှန	40	-														-
HIGH FLOW 7 3	ND	ZA.															⊕€	Þ
		5									₩							<b>⊕</b>
		MILL	20	_							₩							-
		Z																
		_	0															
			0	76 77	78	79 80	81	82	83 84	85	86	87	88	89	90	91 9	92	93

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW

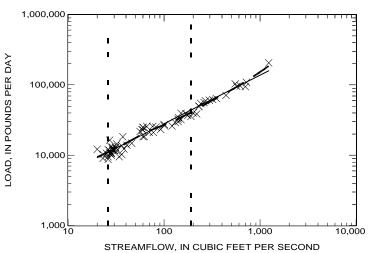


UNCENSORED VALUE 'LESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT NVALUES **VALUES** SLOPE ALL VALUES

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

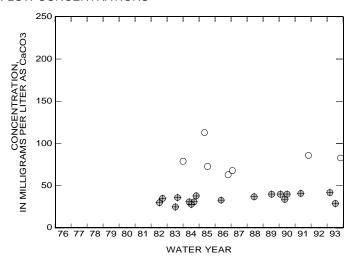
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION	
LOW FLOW	1	HIGH FLOW
0	UNCENSORED VALUE	<b>•</b>
$\vee$	'LESS-THAN' VALUE	$\forall$
$\triangle$	'GREATER-THAN' VALU	E A

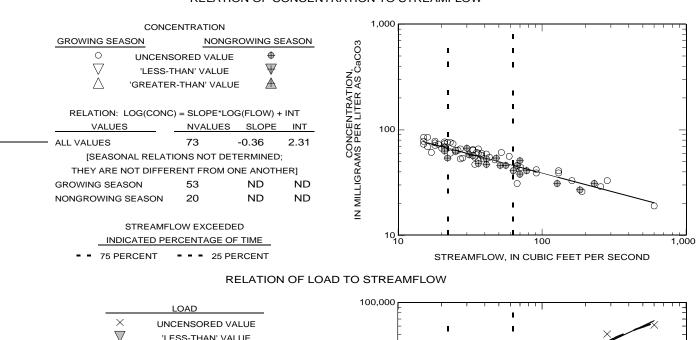
TREINDS IN CONCENTRATION										
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	7	6	ND							
HIGH FLOW	17	9	ND							



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD		100,000	<u> </u>	<del></del>	<del></del>	
$\mathop{\triangledown}^{\times}$	UNCENSORED VALUE 'LESS-THAN' VALUE	>	:	1	; ;	×	-
RELATION: LOG( VALUES	LOAD) = SLOPE*LOG(FLOW)  NVALUES SLOPE	) + INT & W	-		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	*	-
ALL VALUES	73 0.64	3.05	10,000 —				
	ON BETWEEN LOAD AND FLO RE 10 OR MORE VALUES)		- - -		1		-
	EAMFLOW EXCEEDED	OP 0		1	1		-
75 PERCEI	NT 25 PERCENT		1,000	I	100		1,000
			10	STREAMFL	OW, IN CUBIC FEE		1,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

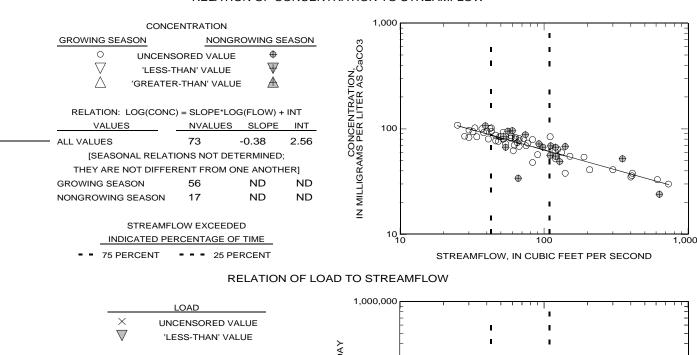
CONCENTRATION		.00	' '		1 1	1	1 1	'	1	' '	- 1		'
LOW FLOW	HIGH FLOW	e O					_						
O UNCENSORED VALU	JE +	08 O	_				0	_					
V 'LESS-THAN' VALUE	≣ ₩ zi	Ŋ,			_ 0	0	$^{\circ}$	9	(	)		0	
△ 'GREATER-THAN' VAL	UE 🕭 🛱	∢ ⊻			ુ જુ <sub>પ</sub>		$\tilde{}$						
	2	Ë 60	-		С	)	0						_
TRENDS IN CONCENTRA	ATION	<b>□</b>			0						Φ.		
VALUES NVALUES NWYS	S SLOPE Ö	Ä						<b>⊕</b>			<b>+</b>	•	
LOW FLOW 18 9	HIGH FLOW  IF   IF   IF   IF   IF   IF   IF   IF	<u>v</u> 40	_		$\oplus$	$\Phi^{\P}$	⊕	Ф		<b>+</b>	<b>⊕</b>		<u>⊕</u>
HIGH FLOW 21 11	ND	₹ S				<b>+</b>		-	<b>⊕</b>		₩		<b>⊕</b>
	Č	<u> </u>				# ⊕					TAIP CHAI		Ψ
	<u> </u>	9   20   W	_						4	<del>)</del>			-
		∑ 7											
	•	<b>_</b>											
		0	<del></del>										ليا
			76 77	78 79 80 8	81 82	83 84	85	86 8	7 88	89	90 9	1 92	93

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



 RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

 VALUES
 NVALUES
 SLOPE
 INT

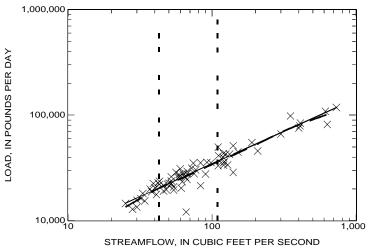
 ALL VALUES
 73
 0.62
 3.3

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

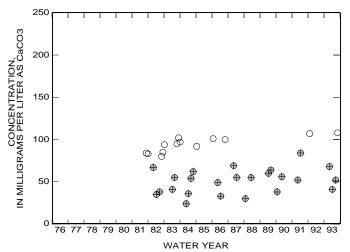
75 PERCENT - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

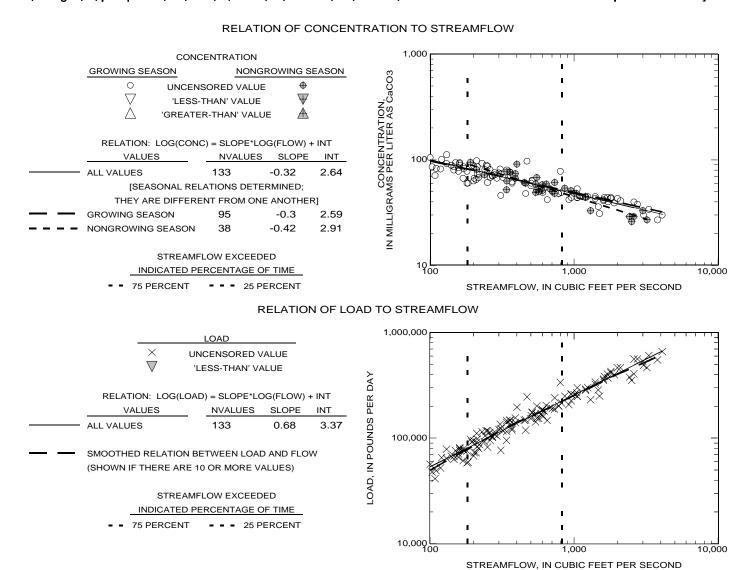
	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>+</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
<u> </u>	GREATER-THAN' VALU	e 🕭

TRENDS IN CONCENTRATION										
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	13	7	ND							
HIGH FLOW	24	10	ND							



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]



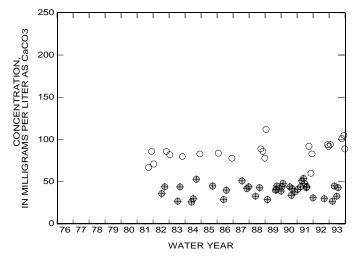
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION										
LOW FLOW			HIGH FLOW							
Ο υ	NCENSORE	D VALUE	<b>⊕</b>							
√ 'LESS-THAN' VALUE  √										
$ riangle$ 'GREATER-THAN' VALUE $ extcal{A}$										
TRENDS IN CONCENTRATION										
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	22	10	ND							

12

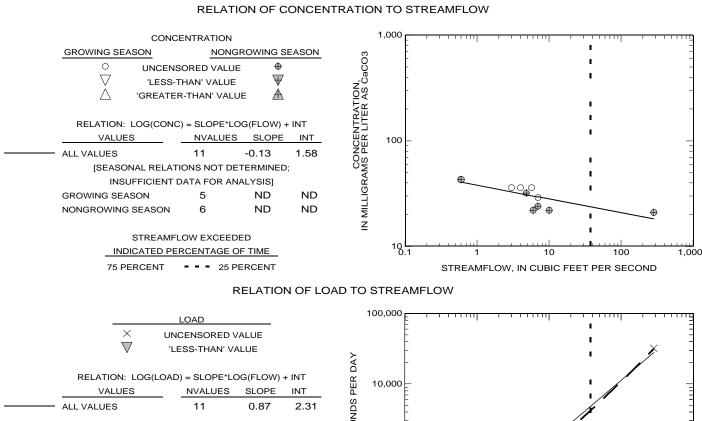
ND

HIGH FLOW



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

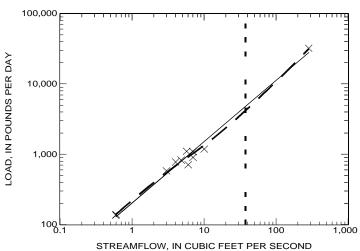


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT

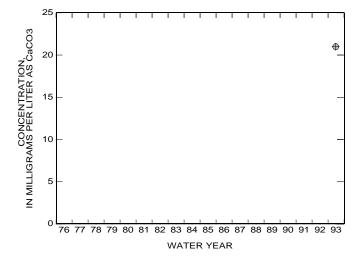


### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION										
LOW FLOW			HIGH FLOW							
Ο υ	NCENSORE	D VALUE	<b>+</b>							
abla 'LESS-THAN' VALUE $ abla$										
△ 'GREATER-THAN' VALUE   ⚠										
TRENDS IN CONCENTRATION										
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	0	0	ND							

ND

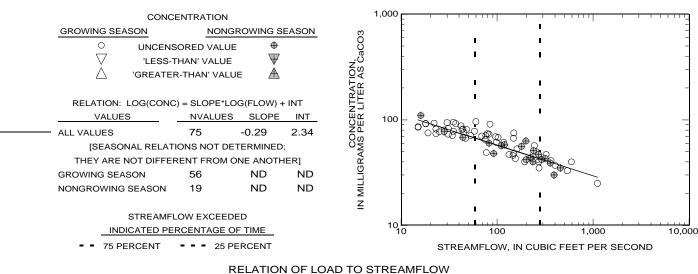
HIGH FLOW



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD		1,000,000	<del>-                                    </del>	<del>-                                    </del>	<del></del>
×	UNCENSORED VALUE		Ē	ı	I	=
V	'LESS-THAN' VALUE	>	÷	I	ı	-
RELATION: LOG(I	LOAD) = SLOPE*LOG(FLOW)	+ INT	100,000 E	I	·	
VALUES	NVALUES SLOPE			1	~ × <b>***</b> ***	3
ALL VALUES	75 0.71	3.07		XX	<b>%</b> **	=
— SMOOTHED RELATION	ON BETWEEN LOAD AND FLO	ow (			<b>*</b> ``	-
(SHOWN IF THERE A	RE 10 OR MORE VALUES)	<u> </u>	10,000			늴
STRE	AMFLOW EXCEEDED	(	5 -		•	=
INDICATE	D PERCENTAGE OF TIME	-	<b>-</b>	<u>.</u>	ī	-
= = 75 PERCEN	NT 25 PERCENT			ı	Ī	-
			1,000	100	1,000	10,000
				STREAMFLOW.	, IN CUBIC FEET PER	R SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

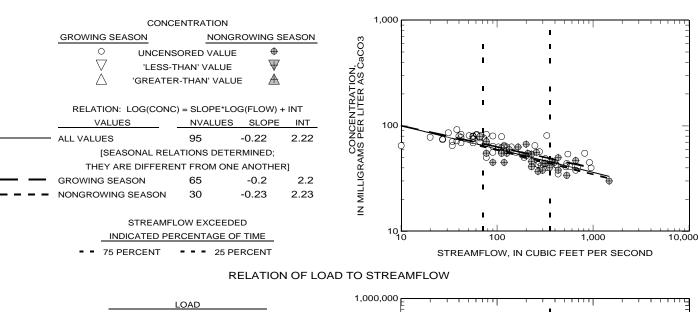
CONCENTRATION		200		1 1	1 1	1 1 1			١
LOW FLOW	HIGH FLOW 0								
O UNCENSORED VALUE	ф ЭаС	200						_	1
'LESS-THAN' VALUE	₩ NOS								
△ 'GREATER-THAN' VALUI	DX DAIS DE PROPERTIES AND SOIN WHAT DAIS DE PROPERTIES AND CACOOS								
	TE.	150	_					_	4
TRENDS IN CONCENTRAT	NOI.								
VALUES NVALUES NWYS	SLOPE ÖÜ			$\circ$					
LOW FLOW 28 12	ND OS	100	_	0		n 0	<u>۵</u> 0	_	-
HIGH FLOW 11 7	ND §			8	<b>6 6</b>	8000	G	° % c	k
	99			9	8 %	0	´ O	0	
	글	50	_		4	→ <b>Φ</b>	<b>⊕</b>	<b>•</b> •	1
	N MILLIG				•	<del>)</del>	<b>+</b>	Φ Φ	
	=				Ψ				
		0	76 77 78 79 8	0 81	32 83 84	4 85 86 87	88 89 90	91 92 93	J

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE		1,000,000
V 'LESS-THAN' VALUE	DAY	
RELATION: $LOG(LOAD) = SLOPE*LOG(FLOW)$	HINT E	Y 100,000 -
VALUES NVALUES SLOPE		
ALL VALUES 95 0.78	2.95 SON	
SMOOTHED RELATION BETWEEN LOAD AND FLO	ow Q	
(SHOWN IF THERE ARE 10 OR MORE VALUES)	ð Z	10,000
STREAMFLOW EXCEEDED	Q.	
INDICATED PERCENTAGE OF TIME	_	·
75 PERCENT 25 PERCENT		
		1,000 10 100 1,000
		STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

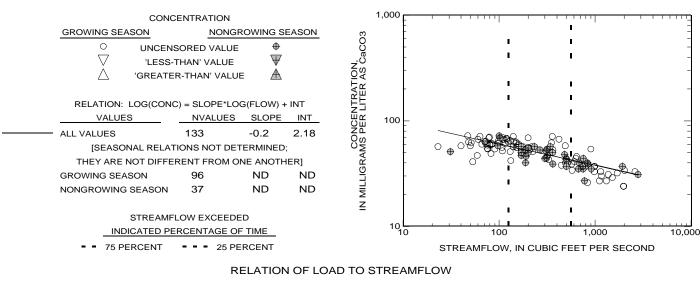
CONCENTRATION	100	~[
LOW FLOW  O UNCENSORED VALUE  VILESS-THAN' VALUE  O GREATER-THAN' VALUE  TRENDS IN CONCENTRATION  VALUES  NVALUES  NVAL	80	
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE  VALUES NVALUES NWYS SLOPE	60	
2	40	, 40 XH
IN MILLIG	20	20 –
_	0	0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

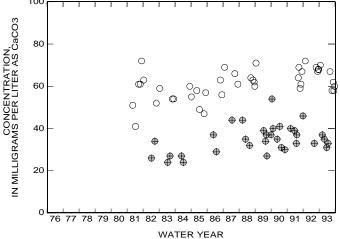
#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	<b>&gt;</b>	1,000,000	1 1		*
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) +	INT	100,000			
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	S LOAD, IN POU	10,000		! !	
INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT		1,000	100	1,000 N CUBIC FEET PER	10,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

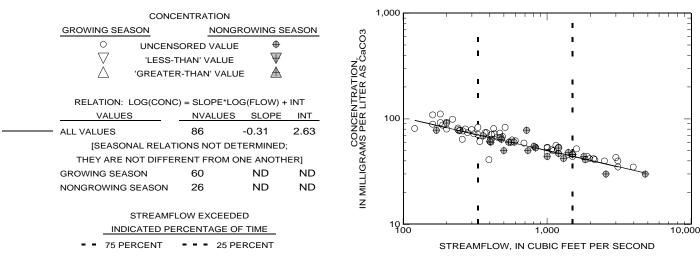
					100						
	CONCENTR	ATION			100		1	1	1	1	-
LOW FLOW			HIGH FLOW	03							
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	aC	80	_					
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$	S, S	00						$\circ$
△ 'GF	REATER-THA	N' VALUI	<b>E</b> ♠	F.∀ P.∀							O
				TER	60	_				(	P
TREN	IDS IN CONC	ENTRAT	ION	55							
VALUES	NVALUES	NWYS	SLOPE	NCE PER						0	
LOW FLOW	42	12	ND	CON	40	_				C	)
HIGH FLOW	33	11	ND	OM M							
				G R							4
				j	-00						,



APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY
01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



### **RELATION OF LOAD TO STREAMFLOW**

LOAD	1,000,000
<ul><li>X UNCENSORED VALUE</li><li>▼ 'LESS-THAN' VALUE</li></ul>	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	
— ALL VALUES 86 0.69 3.5  — SMOOTHED RELATION BETWEEN LOAD AND FLOW	37 89 100,000 X X X X X X X X X X X X X X X X X
(SHOWN IF THERE ARE 10 OR MORE VALUES)	g ×
STREAMFLOW EXCEEDED	-
INDICATED PERCENTAGE OF TIME	
75 PERCENT 25 PERCENT	I I
	10,000 1,000 10,0
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

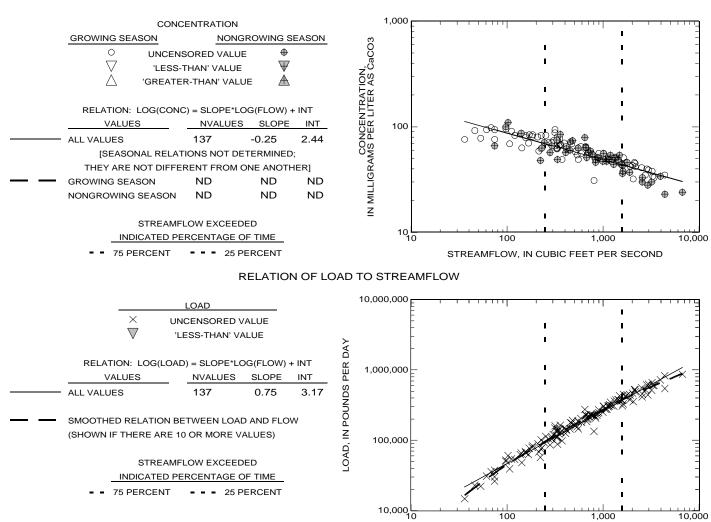
CONCENTRATION	200	, , , , , , , , , , , , , , , , , , ,
LOW FLOW HIGH FLOW	Ö	
○ UNCENSORED VALUE ♥  VLESS-THAN' VALUE ▼	AS CaC AS CaC	_
/\ GREATER-THAN VALUE		
	MS PER LITER MS PER LITER 100	-
TRENDS IN CONCENTRATION	⊒	
VALUES NVALUES NWYS SLOPE C	ŽΨ̈́	
LOW FLOW 22 6 ND	<u>20</u> 100	0
HIGH FLOW 17 4 ND	≴	
	5	000
	J 50	
	Z	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

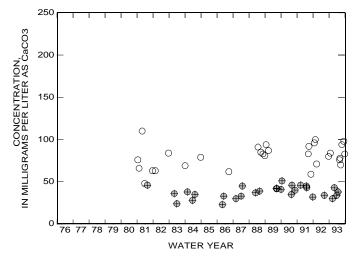
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
O U	NCENSORE	O VALUE	<b>⊕</b>
▽ ,	LESS-THAN	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	<b>A</b>
TREN	DS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	30	10	ND
HIGH FLOW	29	11	ND

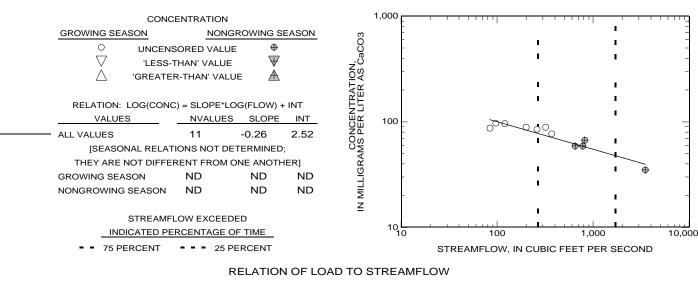


STREAMFLOW, IN CUBIC FEET PER SECOND

APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY
01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



			1,000,000				
	LOAD	_	<b>F</b>				=
×	UNCENSORED VALUE		ļ.		Ī	· //	7
$\nabla$	'LESS-THAN' VALUE		> -		i		-
RELATION: LOG	(LOAD) = SLOPE*LOG(FL	OW) + INT	R D.				=
VALUES	NVALUES SLC	PE INT	PER -				=
ALL VALUES	11 0.7	74 3.25	DS			i	
SMOOTHED RELATI	ON BETWEEN LOAD AND	) FLOW	100,000	<i></i>			=
(SHOWN IF THERE A	ARE 10 OR MORE VALUE	S)	Z Ú		_	1	-
STR	EAMFLOW EXCEEDED		- OA	, ,	1	Ī	-
INDICAT	ED PERCENTAGE OF TIM	<u>1E</u>	_				-
= = 75 PERCE	NT = = 25 PERCE	ENT			1	1	
			10,000	100	1,000	)	10,000
				STREAMFLOW,	IN CUBIC FEET PER	R SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

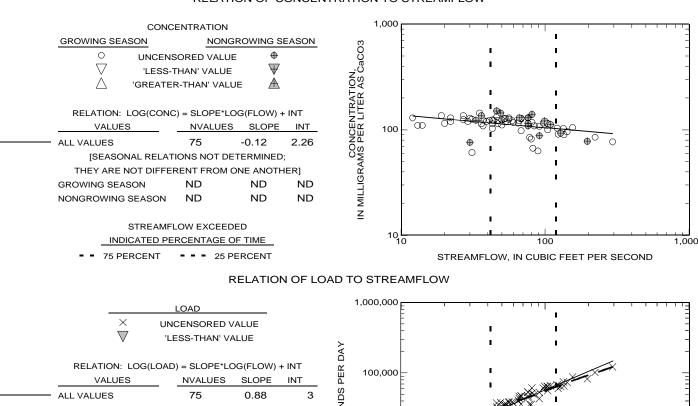
CONCENTRATION	100	7
LOW FLOW HIGH FLOW O		00
LOW FLOW  O UNCENSORED VALUE  VILESS-THAN' VALUE  O GREATER-THAN' VALUE  O GREATER-THAN' VALUE  □ GREATER-THAN' VALUE	80	
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE  LOW FLOW 5 2 ND 050  VALUES NO 050  VALUES N	60	-
VALUES NVALUES NWYS SLOPE OÜ		
LOW FLOW 5 2 ND ON	40	) <del> </del> -
HIGH FLOW 1 1 ND & & & & & & & & & & & & & & & & & &		<b>•</b>
MELL	20	-
Z		
	0	) <del>  </del>
	Ū	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

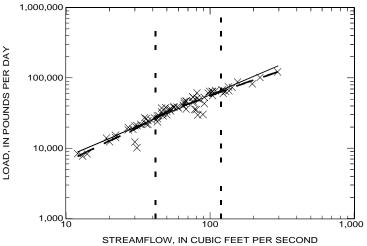


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW	1		HIGH FLOW
0	UNCENSORE	D VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
$\triangle$	'GREATER-THA	N' VALUE	<b>A</b>
TR	RENDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE

10

8

ND

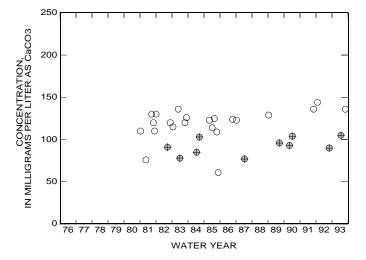
ND

22

10

LOW FLOW

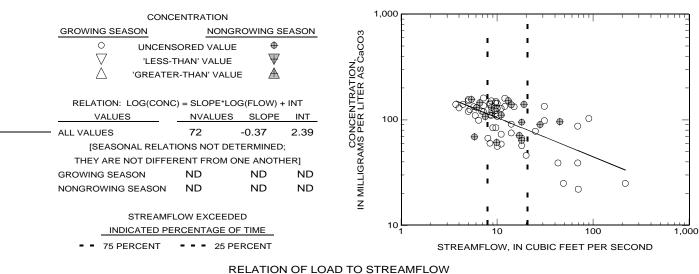
HIGH FLOW



### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD		100,000	<del>-                                    </del>	•	
× UNCENSORED VALUE		F	ī		=
V 'LESS-THAN' VALUE	>		- I	×	_
	, A	-		×	/× -
RELATION: $LOG(LOAD) = SLOPE*LOG(FLOW) + IN^{-1}$	١ ٢		Ī	$\mathbf{I} \times \mathbf{X}$	
VALUES NVALUES SLOPE IN	<u> </u>		1		1
——— ALL VALUES 72 0.63 3	.12		-	$\times$ $\times$ $\times$	
	.12 SON	10,000 —	<u>.</u> ×	×, <b>/</b> /	_
— SMOOTHED RELATION BETWEEN LOAD AND FLOW	Pol	E		× × ×	=
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Z	F		<% <sub>1</sub>	<u> </u>
	Ď,	F		1	=
STREAMFLOW EXCEEDED	O.	-		-	-
INDICATED PERCENTAGE OF TIME	_	-	×	Ī	_
75 PERCENT 25 PERCENT			ı	Ī	
		1,000	10	100	1,000
			STREAMELOW	IN CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

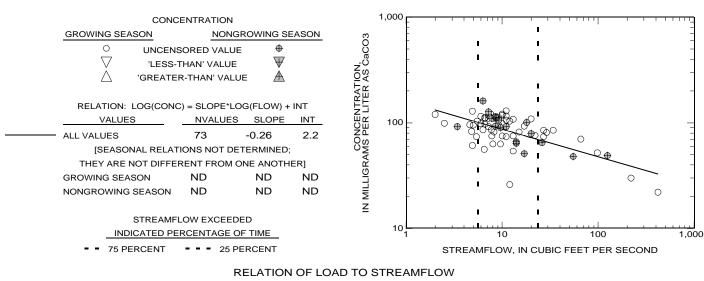
	CONCENTR	ATION			200	1 1	'		1	1 1	1	ı	1 1	1	1	1 1	1	
LOW FLOW			HIGH FLOW	03														
٥ ر	NCENSORE	D VALUE	<b>⊕</b>	CONCENTRATION, AMS PER LITER AS CaCO3	200	_												
Ŏ.	LESS-THAN	VALUE	$\overline{\Psi}$	NO.														
△ 'GI	REATER-THA	N' VALUI	■ ▲	AT R										0				
				7.E	150	L			_					ŏ			<b>D</b> C	, –
	IDS IN CONC			Ä Z Z				0	0					0		$\oplus$	Ø	
VALUES	NVALUES	NWYS	SLOPE	SA					(	C	0	9	Ω					4
LOW FLOW	19	9	ND	SCO	100	_				. 4	, 0		_	+	₽	ФО		-
HIGH FLOW	12	9	ND	ZAN						Φ ,	₽		$\oplus$					
				5				0			*							
				IN MILLIG	50	_							_	_				-
				2								Φ.	0	<b>⊕</b>	Φ.			
				_				1	<b>+</b>			<b>⊕</b>			<b>⊕</b>			
					0	76 77 7	78 70	80.81	1 82	83 8	1 85	5 86	87	88 80	90	01	92 (	33
						10 11 1	0 13	00 0	. 02	03 0	+ 00	, 30	01	00 03	, 30	01	J2 :	,,,

WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



			100 000			
	LOAD		100,000		•	
×	UNCENSORED VALUE		-			
$\nabla$	'LESS-THAN' VALUE		-		•	/ ×
		2	[	•	. *	/-
RELATION: LOG	S(LOAD) = SLOPE*LOG(FLOW)	+ INT		ı		
VALUES	NVALUES SLOPE	INT G	ť þ	- Ī	· i . //	
ALL VALUES	73 0.74	2.93	3	•	×1×1/×	
		2	10,000			
SMOOTHED RELAT	ION BETWEEN LOAD AND FLO	ow S	2	ı 💥		
(SHOWN IF THERE	ARE 10 OR MORE VALUES)	Z	<b>[</b>	× XXXX	<b>∠ I</b>	
		Ş	j ŀ	× <b>13</b>	`	
STR	EAMFLOW EXCEEDED	Š	}	<b>~</b> ***		
INDICAT	ED PERCENTAGE OF TIME	_	-	//××	ı	
= 75 PERCE	NT = = = 25 PERCENT			$\times \times $	I	
			1,000	10	100	
			1		100	1
				STREAMFLOW, IN	N CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

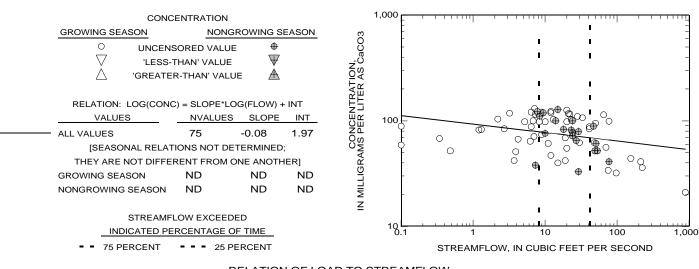
CONCENTRATION	250	'		1 1 1		1 1		
LOW FLOW  O UNCENSORED VALUE  VILESS-THAN' VALUE  O GREATER-THAN' VALUE	R AS CaCO3	_						_
TRENDS IN CONCENTRATION	7H 150	' <b>-</b>						_
VALUES NVALUES NWYS SLOPE LOW FLOW 10 8 NE	DW OOM 100	<u> </u>	0 0	0 0		0		_
HIGH FLOW 11 9 NE	LIGRA		O	<b>+</b>	<b>#</b>	Ф Ф	•	ФС
	Z Z			<b>⊕</b>	<b>⊕</b>	Ф Ф	<b>⊕</b>	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

### APPENDIX 1. Relations of constituent concentration and load to streamflow and trends in concentration with time ALKALINITY 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



### RELATION OF LOAD TO STREAMFLOW

	LOAD			1	,000,000	<del> </del>		•	1 1 11111
$\overset{\times}{\triangledown}$	UNCENSORED V			≻	100,000		1	i	
RELATION: LOG	(LOAD) = SLOPE*LO	OG(FLOW)	+ INT	IR D	Ē		1		
VALUES	NVALUES	SLOPE	INT	В	10,000		1.	~ <b>**</b>	
— ALL VALUES	75	0.92	2.7	NDS	10,000			×	
- SMOOTHED RELATI	ON BETWEEN LOAD	O AND FLO	w	Pou	1,000 =			•	
(SHOWN IF THERE A	ARE 10 OR MORE V	ALUES)		Ž.	1,000		×	I	
STR	EAMFLOW EXCEED	ED		OAL	100 = 2	XX	1 1	I	
INDICAT	ED PERCENTAGE C	F TIME		_				ı	
75 PERCE	NT = = 25 P	ERCENT			*		1	ı	
					10	1	10	100	1,
						STREAM	FLOW, IN CUBIC	C FEET PER SE	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			1 1	ı	1 1	' '	'	1 1	1		- 1	1 1	1
LOW FLOW HIGH FLOW	Ö												
○ UNCENSORED VALUE ⊕	0 0 0 20	00 –											_
√   'LESS-THAN' VALUE   √	NO.												
△ 'GREATER-THAN' VALUE  A  A  A  A  B  C  A  C  C  C  C  C  C  C  C  C  C  C	CONCENTRATION, AMS PER LITER AS CaCO3												
	Ž₽ 15	50 —											_
TRENDS IN CONCENTRATION	ΝZ									0			
VALUES NVALUES NWYS SLOPE	3,5						0	P	(	)	<b></b>	0	
LOW FLOW 23 11 ND	<u> </u>	00 –				0		Ф О	0		<b>#</b>		_
HIGH FLOW 16 10 ND	S S				+	<b>\$</b> ○		w 0	9			0	
	<u>6</u>					% 0	0			0		⊕ ⊕	
	; ⊑	50 –			0	_	0	<b>#</b>	₩	$\oplus$	4		_
	IN MILLIG				C	<sup>O</sup> ⊕			0		Ψ	ф Ф	<b>⊕</b>
	₹								4	<del>)</del>			
		0 76	77 7	8 70	80.8	21 82	83 8	1 85	86 87	98 9	80 00	01 0	2 03
		70	,,,,	0 79	00 6	1 02	00 0	+ 00	00 01	00 0	שם פנ	י פופ	12 93

WATER YEAR

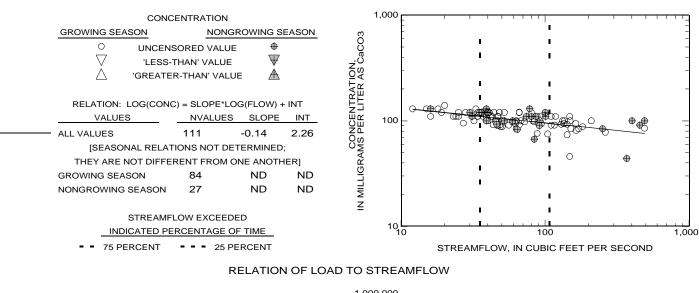
## Appendix 2 Hardness

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



1	LOAD		1,000,000	1 1 1 1 1 1 1 1	<del>                                     </del>	<del></del>
	CENSORED VALUE SS-THAN' VALUE	> <sub>\delta</sub>	-	1	` !	
RELATION: LOG(LOAD) VALUES	) = SLOPE*LOG(FLOW) · NVALUES SLOPE	INT H	100,000	l l}	- ×	_
— ALL VALUES  — SMOOTHED RELATION BE	111 0.86  TWEEN LOAD AND FLO	2.99 SQN N O	- - -		×	= = = = = = = = = = = = = = = = = = = =
(SHOWN IF THERE ARE 10	OR MORE VALUES)	AD, IN	10,000	ı	! !	
STREAMFL	OW EXCEEDED	)	_ -	I		=
INDICATED PER	RCENTAGE OF TIME		-		1	-
■ ■ 75 PERCENT	25 PERCENT		_	i	1	-
			1,000	10	00	1,000
				STREAMFLOW, IN CUE	BIC FEET PER SECO	DND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

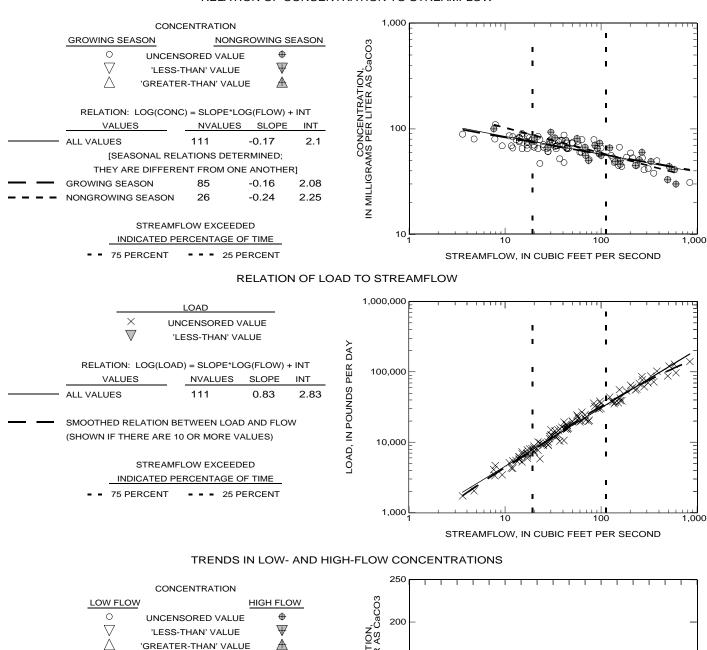
	CONCENTR	ATION			200	'	'	1			ı	1	1			1		- 1	- 1		1
LOW FLOW			HIGH FLOW	. °C																	
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	CONCENTRATION,	200	L															
, ·	LESS-THAN'	VALUE	$\overline{\Psi}$	N. O.																	
△ 'GF	REATER-THA	'N' VALUE	■ ▲	ATIC R A																	
				TR/	150	L															_
TREN	DS IN CONC	ENTRAT	ION	Z –			0			0			ത							0	
VALUES	NVALUES	NWYS	SLOPE				_			oŏ	_		С					Φ.	~	0 C	
LOW FLOW	22	11	ND	0.5	100	_	⊕ .	∌ ,	, 0	)	0	<b>€</b>	Q	D #E				<b>⊕</b>	0	4	<del>+</del>
HIGH FLOW	26	11	ND	Z Z			•	* €				<b>P</b>			Φ	+					
				<u> </u>								•	<del>)</del>								
				<u> </u>	50	L	<b>⊕</b>											<b>⊕</b>			_
				Σ			Ψ											Ψ			
				2																	
					0	<u></u>		<del></del>													لي
						76	77 78	79	80	81	82 8	3 84	85	86	87	88	89	90 9	1 9	2 9	)3

WATER YEAR

### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



TRENDS IN CONCENTRATION

25

28

NVALUES NWYS

14

15

SLOPE

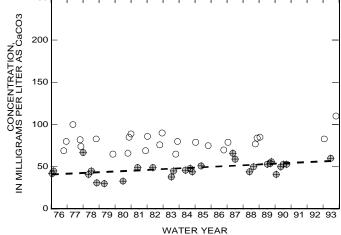
ND

0.92

VALUES

LOW FLOW

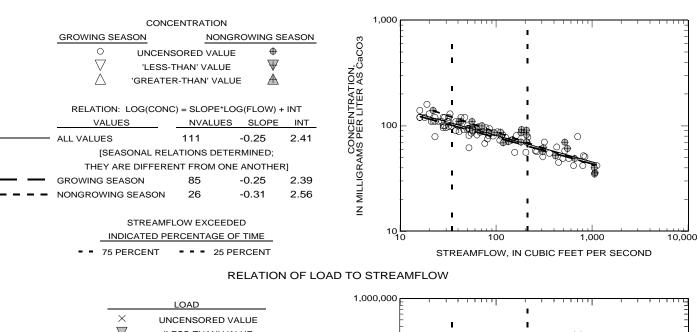
HIGH FLOW



### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD		1,000,000	<del>-                                    </del>	<u> </u>	
× UNCENSORED VALUE		E	I	I	3
V 'LESS-THAN' VALUE	>	Υ	Ī	1	-
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW	/) + INT	100,000	ı	. Mr. MX	
VALUES NVALUES SLOPE		<u>.</u>			=
ALL VALUES 111 0.75	3.14				=
SMOOTHED RELATION BETWEEN LOAD AND FL (SHOWN IF THERE ARE 10 OR MORE VALUES)	-OW (	10,000		1 1	1
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	- -	- CAL	1	1	= = = = = = = = = = = = = = = = = = = =
75 PERCENT 25 PERCENT	-	_	ı	1	-
		1,000	100	1,000	10,000
			STREAMFLOW, I	N CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	
LOW FLOW HIGH FLOW	03
○ UNCENSORED VALUE	νον ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ ΣΟΝ
√   'LESS-THAN' VALUE   √	$z_{\omega}^{2}$
△ 'GREATER-THAN' VALUE    A	L .
	조는 150 —
TRENDS IN CONCENTRATION	<u></u>
VALUES NVALUES NWYS SLOPE	
LOW FLOW 26 14 ND	MS PER LITERAL 1200 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
HIGH FLOW 26 14 0	√
	<u>z</u>

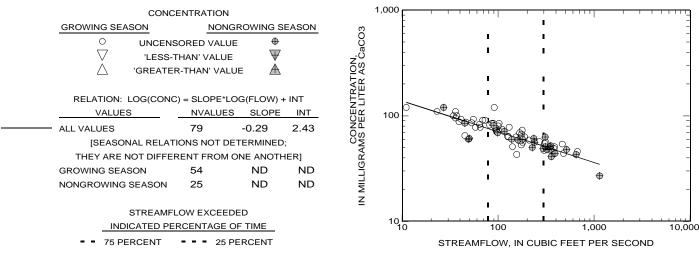
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

250

### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



### **RELATION OF LOAD TO STREAMFLOW**

	LOAD		1,000,000		•	
×	UNCENSORED VAL	UE	F			=
$\nabla$	'LESS-THAN' VALU	JE	> -	i	I	-
RELATION: LOG	i(LOAD) = SLOPE*LOG(	(FLOW) + INT	A			-
VALUES	NVALUES S	SLOPE INT	100,000 L	· 1		
ALL VALUES	79	0.71 3.16	S I			-
SMOOTHED RELATI	ON BETWEEN LOAD A	ND FLOW	Pod -		•	-
SHOWN IF THERE	ARE 10 OR MORE VALU	UES)	Z 10,000	× ·	i	-
STR	EAMFLOW EXCEEDED	)	-0AE	· ·	1	
INDICAT	ED PERCENTAGE OF	TIME	-		Ī	
75 PERCE	NT 25 PER	RCENT	_	1	1	
			1,000	100	1,000	10,0
				STREAMELOW	IN CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

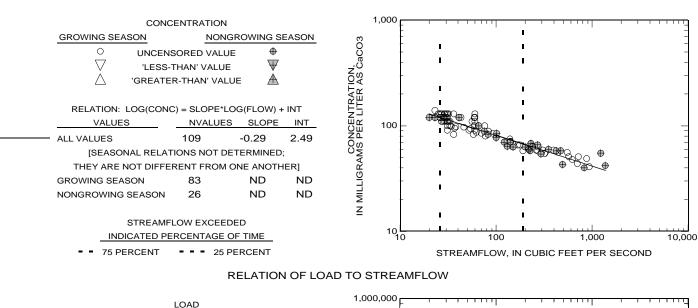
CONCENTRATION	:	250		ı	1 1	ı	1				1	ı	1 1	- 1		
LOW FLOW         HIGH FLOW           ○         UNCENSORED VALUE         ⊕           ✓         'LESS-THAN' VALUE         ₩           ✓         'GREATER-THAN' VALUE	CONCENTRATION, MS PER LITER AS CaCO3	200 -	-													_
TRENDS IN CONCENTRATION	ENTRA R LITEF	150	-													-
VALUES         NVALUES         NWYS         SLOPE           LOW FLOW         21         11         ND           HIGH FLOW         20         10         ND	CONCE AMS PEF	100 -	- C	0	)	0			(		0	(	)		0	0 0
	IN MILLIGR	50∉	<b>₹⊕</b>		) + +	<b>⊕</b> ⊘	<b></b>			•			<b>⊕</b>		4	) <del>0</del>
		0	76 7	7 78	79	80 8	1 82	2 83	8 84	85 8	6 87	7 88	89 9	90 9	1 92	93

WATER YEAR

### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD		1,000,000	<del></del>		<del></del>
× UNCENSORED VALUE  VLESS-THAN' VALUE	>	-	1	! ! *	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW VALUES NVALUES SLOPE	INT 0		1		-
ALL VALUES 109 0.71	3.22	2 2 100,000 –		ı	_
SMOOTHED RELATION BETWEEN LOAD AND FL	.ow $\overline{S}$	Ž F	i I sa		3
(SHOWN IF THERE ARE 10 OR MORE VALUES)	<u> </u>	<u> </u>		× I	=
STREAMFLOW EXCEEDED	4	5 -	1	•	-
INDICATED PERCENTAGE OF TIME	-	-		I	-
75 PERCENT 25 PERCENT				ı	
		10,000	100	1,000	10,000
			STREAMFLOW, IN	CUBIC FEET PER S	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

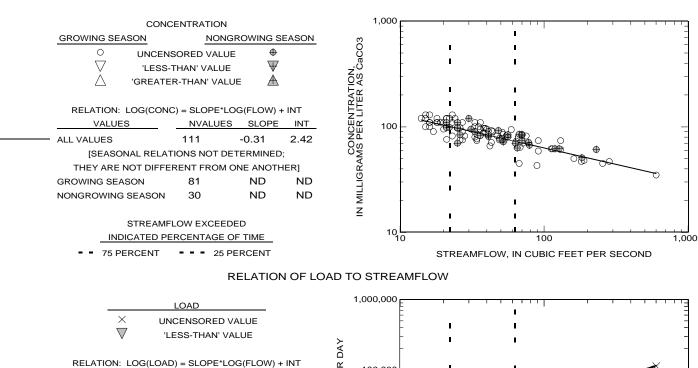
	CONCENTR	ATION			200	'	1	ı	1 1		'	- 1					1		1	1	'	
LOW FLOW			HIGH FLOW	. 8																		
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	SaC	200	L																
$\triangle$	LESS-THAN	VALUE	$\overline{\Psi}$	χ̈́ο																		
△ 'GF	REATER-THA	AN' VALUE	■ ▲	R A																		
				ZEZ	150	L																
TREN	IDS IN CONC	ENTRAT	ION	Z_								0								0		С
VALUES	NVALUES	NWYS	SLOPE	5,5			0						(	0	Œ	)						
LOW FLOW	8	7	ND	CONCENTRATION,	100	L																_
HIGH FLOW	32	14	0	ZAZ ZAZ																		
				<u>G</u>			Φ		<b>#</b>						<b>⊕</b>		<b>⊕</b>	Φ,	<b>#</b>	<b>⊕</b>	•	₽
				IN MILLIG	50		Ψ ∰	•			₩	<b>+</b> +	<b>**</b>		₩		Ψ	+	TO THE			<b>+</b>
				Σ			4	•	0			Ψ										
				₹																		
					0	76	77 7	8 79	90	01	02	02 0	24	0E	96	97	00	90	00	01	03	03
						76	,,,,	0 /9	00	01	02	03 (	54	00	00	01	00	09	90	91	92	93

WATER YEAR

### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

ALL VALUES

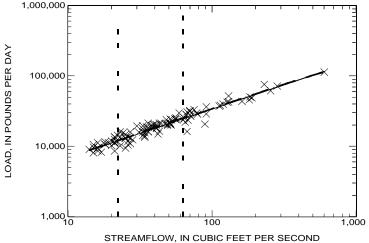
NVALUES

SLOPE

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

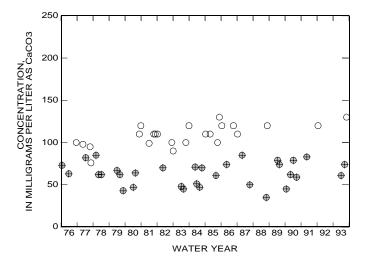
75 PERCENT - - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>\Phi</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$ ,	GREATER-THAN' VALUE	<b>A</b>
TR	ENDS IN CONCENTRATI	ON

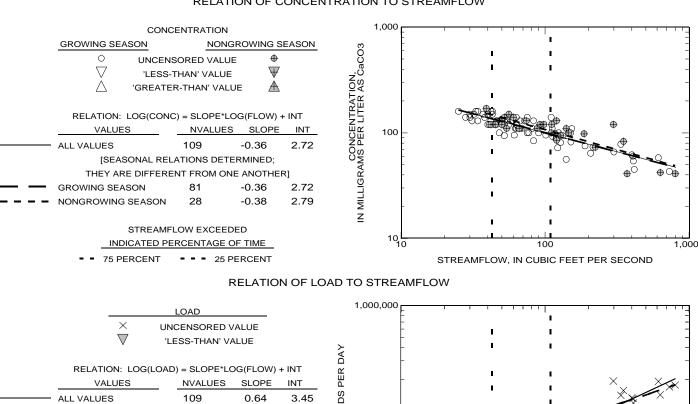
TRENDS IN CONCENTRATION												
VAL	JES	NVALUES	NWYS	SLOPE								
LOW F	LOW	24	12	ND								
HIGH I	FLOW	32	16	0								



### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

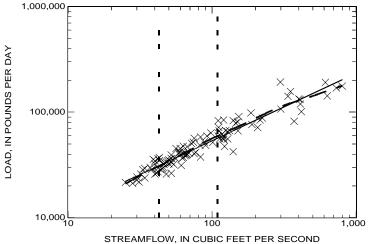


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

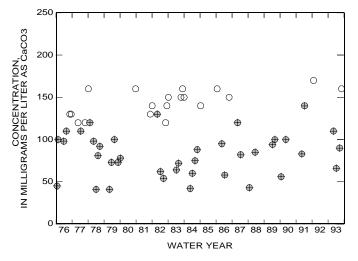
75 PERCENT - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION								
LOW FLOW	<u> Н</u>	IGH FLOW						
0	UNCENSORED VALUE	$\oplus$						
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$						
$\triangle$	'GREATER-THAN' VALUE	$\triangle$						

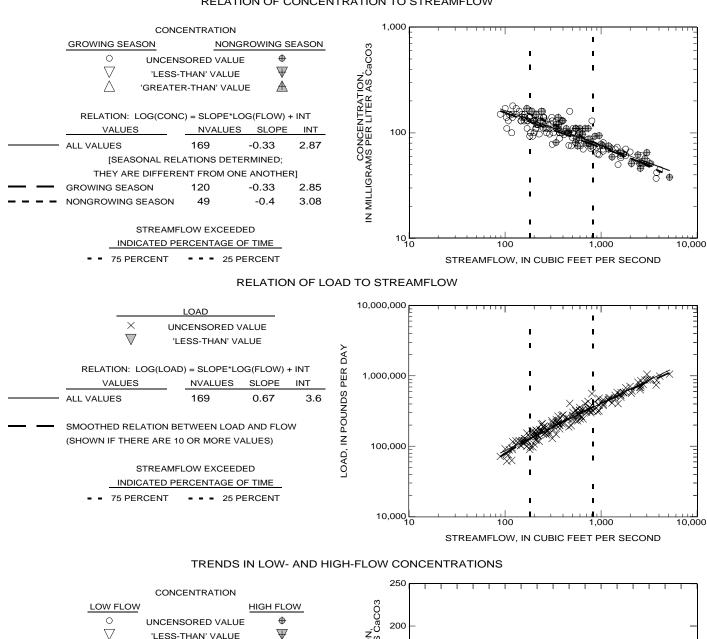
TRENDS IN CONCENTRATION										
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	19	11	ND							
HIGH FLOW	39	15	0							



### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



Δ

VALUES

LOW FLOW

HIGH FLOW

'GREATER-THAN' VALUE

TRENDS IN CONCENTRATION

29

47

NVALUES NWYS

14

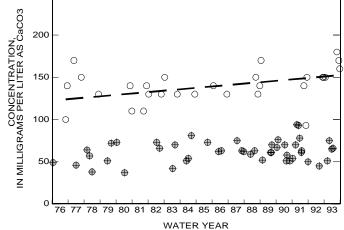
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SI OPE

1.67

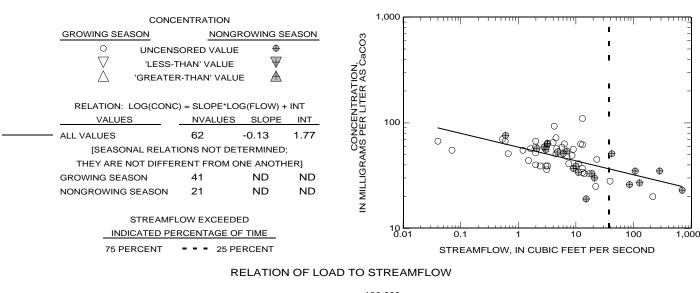
0



### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD		100,000	<del></del>	<del>, , , , , , , , , , , , , , , , , , , </del>	<del></del>	
× UNCENSORED VALUE		Ē			i /	´ 🗐
V 'LESS-THAN' VALUE	DAY	-			ı / ×	-
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW	/) + INT ~	10,000		×	<b>~</b> ^	
VALUES NVALUES SLOPE	INT H	F			1	=
ALL VALUES 62 0.87	2.5	-			Ī	-
	2.5 SON	1,000			-	=
SMOOTHED RELATION BETWEEN LOAD AND FL	$\overline{}$	Ē			Ī	∄
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Z	Ł	<b>W</b>	X	•	=
	AD,	100	<b>/</b> *		1	
STREAMFLOW EXCEEDED	Ŷ.	100				1
INDICATED PERCENTAGE OF TIME	_	E			ı	=
75 PERCENT = = = 25 PERCENT			/x		ī	
		10		d	o Berrande de la co	
		10 L 0.01	0.1	1 10	100	1,000
			STREAMFLOW,	IN CUBIC FEET PE	R SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

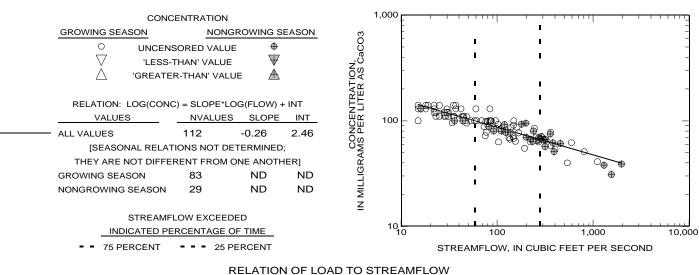
CONCENTRATION	100		1
LOW FLOW HIGH FLOW			
LOW FLOW	80	_	_
TRENDS IN CONSENTRATION	60	·	4
TRENDS IN CONCENTRATION Z J  VALUES NVALUES NWYS SLOPE OU		<b>⊕</b>	
LOW FLOW 0 0 ND Qu	40		╝
HIGH FLOW 8 5 ND		⊕	<b>,</b>
<u></u>		⊕ ⊕ ⊕	
MILLIG N	20	<del>-</del>	-
	0	<u> </u>	J
		76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93	3

WATER YEAR

### APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD		1,000,000	<del>-                                    </del>	<del></del>	<del></del>
× UNCENSORED VALUE		E	ı	· i	$\times$
V 'LESS-THAN' VALUE	<b>&gt;</b>	-	1	ı	€ -
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)	+ INT &	100,000	1		
VALUES NVALUES SLOPE			1		=
ALL VALUES 112 0.74	3.2	}		×× 1	=
— SMOOTHED RELATION BETWEEN LOAD AND FLO	w G			I	=
(SHOWN IF THERE ARE 10 OR MORE VALUES)	<u>z</u>	10,000		Ī	
STREAMFLOW EXCEEDED	Č	<b>5</b>	- I	-	=
INDICATED PERCENTAGE OF TIME	_	<b>'</b>	<u>-</u>	Ī	=
75 PERCENT 25 PERCENT		F	Ī	Ī	-
		1,000	100	1,000	10,000
			STREAMFLOW,	IN CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

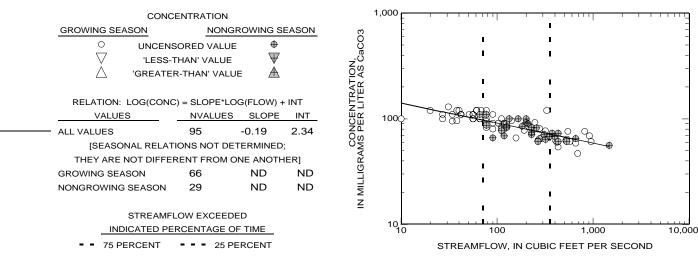
	CONCENTR	ATION			200		ı	1 1	'	1 1	1	1		- 1	1	1	1 1	- 1	
LOW FLOW			HIGH FLOW	<u>/</u> $_{0}^{\circ}$															
O U	NCENSORE	D VALUE	<b>⊕</b>	CONCENTRATION, AMS PER LITER AS CaCO3	200	L													
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$	N. O.															
△ 'GI	REATER-THA	N' VALUI	■ ▲	A A															
				<u> </u>	150	L													_
TREN	IDS IN CONC	ENTRAT	ION	Z Z			0	0 0	0	0 0		0	0	0	00	0	0		0
VALUES	NVALUES	NWYS	SLOPE	PE		0	•	0	0 (	Ø _	<b>O</b>	0 (	Ċ		_	_	_	00	
LOW FLOW	39	16	0	SO	100	<u> </u>	)		8		00	~ (	) (	U	0			w	-
HIGH FLOW	19	12	ND	ZAZ			<b>⊕</b>		0	Ü									_
				<u>5</u>			Ψ.	$\oplus$			Ф		<b>+</b>		4	Φ •	$\oplus$	*	<b>+</b>
				IN MILLIGI	50	⊕			$\oplus$	#	∌ *		<b>⊕</b>						-
				2			₩	<b>⊕</b>		-	7					+	<b>+</b>		
				=															
					0	76 7	77 78	79	80 81	82 8	3 84	85	86	87 8	8 80	90	91 (	92 0	13
						, 5 ,		. 5	00 01	02 0	5 54	- 55	55	<i>o, o</i>		. 50	01.	、	,,,

WATER YEAR

# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	LOAD				1,000,000	<del>-                                    </del>	•	<del></del>
×	UNCENSORED V	ALUE			F		· · · · · · · · · · · · · · · · · · ·	=
$\nabla$	'LESS-THAN' VA	LUE		>	Ē	i		=
RELATION: LOG(LO	OAD) = SLOPE*LC	G(FLOW)	+ INT	R D/	100,000			_
VALUES	NVALUES	SLOPE	INT	PE	100,000	i	<b>*</b> **	<u> </u>
ALL VALUES	95	0.81	3.07	NDS	Ē	×	ı	=
SMOOTHED RELATION	N BETWEEN LOAD	AND FLC	W	POU	Ē	* '		-
SHOWN IF THERE AR	E 10 OR MORE V	ALUES)		Z	10,000	• · · · · · · · · · · · · · · · · · · ·	i	=
STREA	AMFLOW EXCEED	ED		OAL		1	1	
INDICATED	PERCENTAGE C	F TIME		_	-		1	-
75 PERCENT	T = = = 25 P	ERCENT			-	i	1	-
					1,000	100	1,000	10,0
						STREAMFLOW, IN (		

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	_		1 1	'	1 1	- 1	ı		ı	'	1	ı			ı	1
LOW FLOW HIGH F	ow_ ow_															
O UNCENSORED VALUE	. O 20	200 –														
√ 'LESS-THAN' VALUE	γου - Σου -															
△ 'GREATER-THAN' VALUE Z	CONCENTRATION, NO. 10 TO															
	ZH 1:	50														_
TRENDS IN CONCENTRATION	Z											$\circ$				
VALUES NVALUES NWYS SLOPE	- 25													0	_	0
LOW FLOW 25 7 N		00									0 (	) (	) C	) (S)	00	9
HIGH FLOW 19 6 N	)															
	G										•	*	₩ • • •	<b>⊕</b>		txt
	∃ ,	50									4	4	, w —		Φ,	
	IN MILLIG												*			
	₹															
		ے ہ	0 77	70 70		24 0	2 00		05 0	0-0-	7 00	-00		04 (	20 (	
		/	6 77	78 79	80 8	31 8	2 83	84	85 8	6 8	88	89	90	91 9	92 9	13

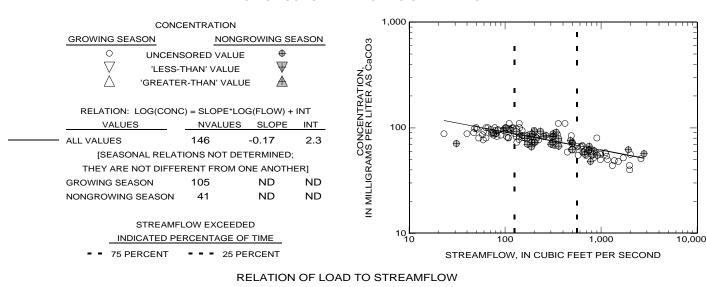
WATER YEAR

250 -

# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



$ imes$ UNCENSORED VALUE $ ilde{\mathbb{V}}$ 'LESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	POS PER DA
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	100,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	10,000 1,000 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

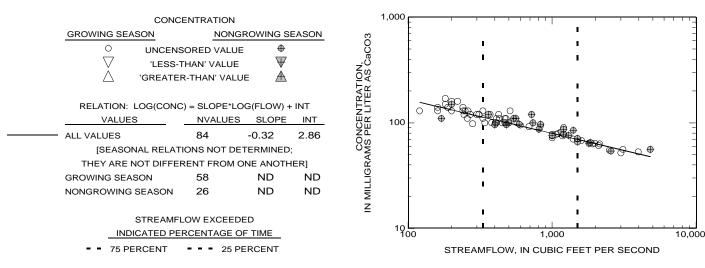
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			250			1	1	П	1	1	ı	1	1
LOW FLOW			HIGH FLOW	03											
$\bigvee_{\Lambda}$	INCENSOREI 'LESS-THAN' REATER-THA	VALUE	⊕ ₩ ± <u>A</u>	VTION, R AS CaCO3	200	_									
TREN VALUES	IDS IN CONC	ENTRATI	ON SLOPE	を正	150	_									
LOW FLOW HIGH FLOW	45 36	13 13	ND ND	CONCENT		_		(	නි <sup>ර</sup> ද	30	0	<b>o</b> C	00	8	-
				IN MILLIGE		_	4	₩	J	₩	⊕ €	Þ	<b>⊕</b>	. •	•

# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

$\overline{\hspace{1cm}}^{ imes}$	LOAD UNCENSORED V 'LESS-THAN' VA			<b>&gt;</b>	10,000,000	ı	· · · · · · · · · · · · · · · · · · ·	1 1	1 1 1	- - - -
RELATION: LOG(I VALUES  ALL VALUES	LOAD) = SLOPE*LO  NVALUES  84	OG(FLOW) SLOPE 0.68	+ INT INT 3.6	NDS PER DA	1,000,000					
	RE 10 OR MORE V	ALUES)	)W	LOAD, IN POUN	100,000		1			-
INDICATE 75 PERCEN	D PERCENTAGE C	ERCENT			10,000		1,000	1 1		10,00
						STREA	AMFLOW, IN CUBIC	FFFT PF	R SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

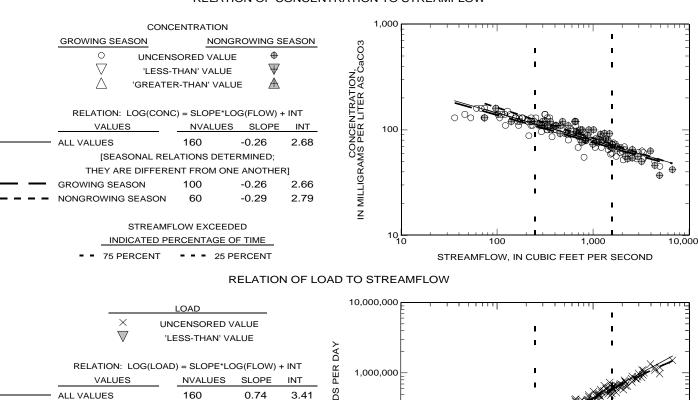
CONCENTRATION		250	- 1	- 1	ı	1	1	ı	ı	ı	ı	1	-	-	1	1	- 1	
LOW FLOW  UNCENSORED VALUE  VILESS-THAN' VALUE  GREATER-THAN' VALUE	CONCENTRATION, MS PER LITER AS CaCO3	200	_															-
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	SENTRA	150	_														000	<u>``</u> @@
LOW FLOW 23 6 ND HIGH FLOW 16 4 ND	CONC RAMS PE	100	_												0	0	0	0000
	IN MILLIGF	50													<b>⊕</b>	<b>₽₽₽</b>		<b>*</b>
	=	0	76 7	7 78	3 79	9 80	81	82	2 83	3 84	4 8	5 8	6 8	7 88	8 89	90	91 9	92 93

WATER YEAR

# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

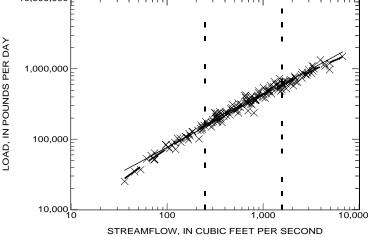


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



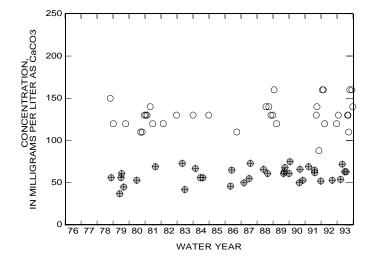
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION								
LOW FLOW	HIGH FLOW							
Ο υ	<b>+</b>							
$\nabla$	√							
△ 'GF	REATER-THA	N' VALUE	■ 🛦					
TREN	ION							
VALUES	SLOPE							
LOW FLOW	35	13	0					

14

0

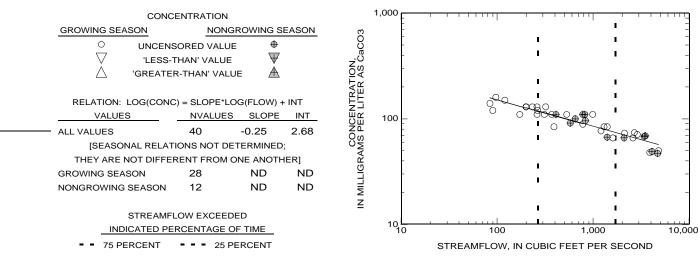
HIGH FLOW



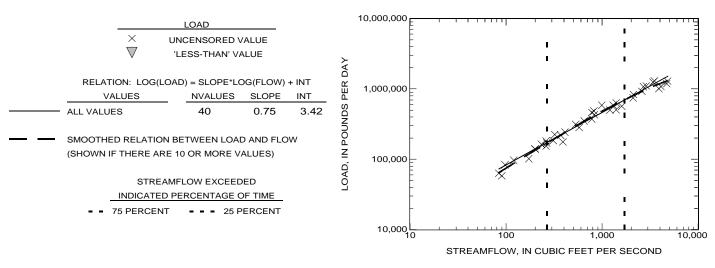
# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

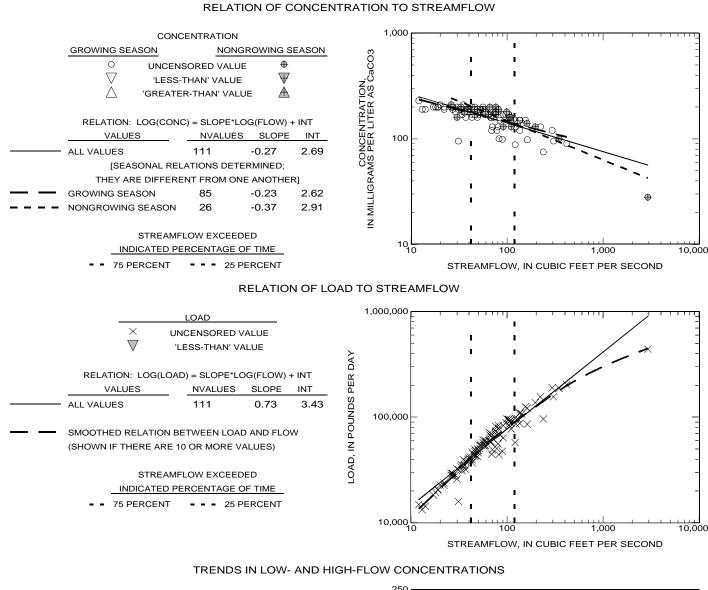
CONCENTRATION		200	1 '	1 1	1		- 1		' '					'		'
LOW FLOW	HIGH FLOW	Ö														
O UNCENSORED VALUE	<b>⊕</b>	0 200	_													_
'LESS-THAN' VALUE	₩	χς Ο														
△ 'GREATER-THAN' VALUE	E A	CONCEN I KA I ION; AMS PER LITER AS CaCO3 00 120 120 120 120 120 120 120 120 120 1													_	
	Ì	호 <u>별</u> 150	_												0	$\Theta$
TRENDS IN CONCENTRATI	ION	7 7 7		C	)					С	)				0	0
VALUES NVALUES NWYS	SLOPE Q	Z Z Z		0 0	,		0			_		0				
LOW FLOW 11 8	ND (	ဥ္ပစ္ 100	-				O									-
HIGH FLOW 11 7	ND	ZA.						_					Φ.			
		<u>5</u>	4	$\oplus \oplus$	$\oplus$			<del>•</del>			4	₽	0			<b>⊕</b>
		50 MILLIG	_	⊕ ⊕	$\oplus$											-
		≥ Z														
		=														
		0	76	77 78	79 80	81 8	32 83	84	85	86	87	88	89 9	90 9	1 92	93

WATER YEAR

250 -

# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]



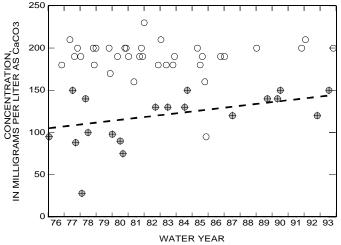
О U	<ul> <li>UNCENSORED VALUE</li> </ul>									
$\nabla$ ,	'LESS-THAN' VALUE									
△ 'GF	'GREATER-THAN' VALUE									
TREN	DS IN CONC	ENTRATI	ION							
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	35	15	0							
 HIGH FLOW	19	12	2.21							

LOW FLOW

0

CONCENTRATION

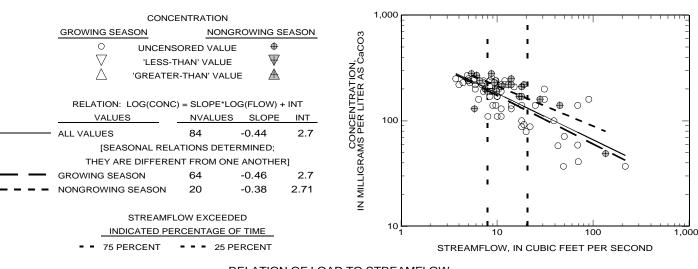
HIGH FLOW



# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD	100,000
<ul><li>X UNCENSORED VALUE</li><li>VESS-THAN' VALUE</li></ul>	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         84         0.56         3.43	NO 10,000 -
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	AD, IN POLY
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT	
75 PERCENT 25 PERCENT	1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		000	' '			1 1	'	- 1			1 1 1
LOW FLOW	HIGH FLOW	3									
O UNCENSORED VALUE	<b>⊕</b> ⊕	2 400	_								_
√     'LESS-THAN' VALUE	₩ ××	)									
△ 'GREATER-THAN' VALU	JE A Ş	<u> </u>									
	TION Z- SLOPE ND OW	300	_								_
TRENDS IN CONCENTRA	TION	j		С	)					0	0
VALUES NVALUES NWYS	SLOPE Ö	j		~	0	0		0		0	° & ° d
LOW FLOW 22 10	ND Öğ	200	_	Q	, -			9	0		<b>•</b> –
HIGH FLOW 16 11	ND	ξ		O		<b>⊕</b>	<b>⊕</b>	0		<b>⊕</b>	0
	<u>Q</u>	2			0	*	$\oplus$		$\oplus$	•	⊕
	<u>g</u>	100	_	₩							_
	2	7							<b>⊕</b>	$_{\oplus}$ $^{\oplus}$	
	2	=		<b>⊕</b>	<b>⊕</b>			$\oplus$			<del>•</del>
		0	76 77 7	78 79 80	81 8	2 83	84 8	85 86	87	88 89 9	90 91 92 93

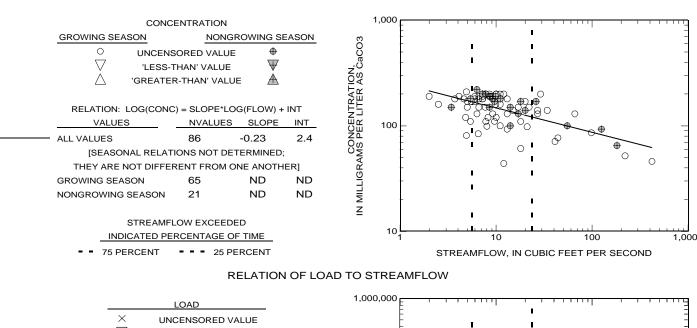
WATER YEAR

500 -

# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



'LESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

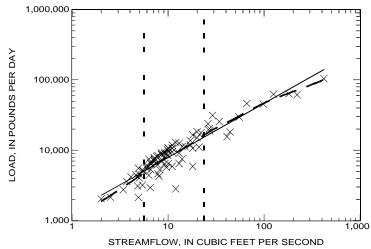
VALUES NVALUES SLOPE INT
- ALL VALUES 86 0.77 3.13

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

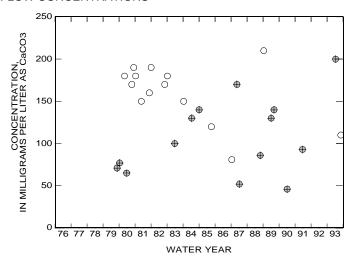
75 PERCENT - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION	
LOW FLOW	I	HIGH FLOW
0	UNCENSORED VALUE	<u>+</u>
$\nabla$	'LESS-THAN' VALUE	$\forall$
$\triangle$	'GREATER-THAN' VALU	E A
	DENIDO IN CONCENTRA	TON!

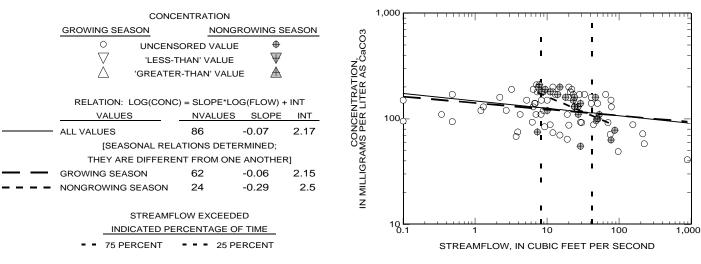
	IKEN	DS IN CONC	ENIRAL	ION
VAI	LUES	NVALUES	NWYS	SLOPE
LOW	FLOW	14	9	ND
HIGH	IFLOW	14	11	ND



# APPENDIX 2. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL HARDNESS 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE	1,000,000
'LESS-THAN' VALUE	¥ 100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	PER D
ALL VALUES 86 0.93 2.9	10,000 × 1
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	00 H 1,000 H 1
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT - 25 PERCENT	
	10 0.1 1 10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	250		1	1 1	1 1	- 1	1	1 1	ı	1	1 1	ı	1
LOW FLOW													
O UNCENSORED VALUE # 0	200	_		0			0			0			_
√ 'LESS-THAN' VALUE ₩ Zoo						0	0		0			0	
∴ 'GREATER-THAN' VALUE     ☐				0	_				O	+	<b>+</b>		
A.R.	150			•						•	<del>)</del>		_
TRENDS IN CONCENTRATION			C	<del></del>			Φ /	0		-		0	
VALUES NVALUES NWYS SLOPE OF					_			ÓCC	)			0	
LOW FLOW 27 13 ND <u>ဝိ</u> ဋ္ဌ	100	_		_	0	0			⊕ "	0	⊕ €		_
HIGH FLOW 19 12 ND			<b>⊕</b>	4	0 0			<b>⊕</b>			$\oplus$		
G <sub>R</sub>				Ф C	O <b>Φ</b>	0			$\oplus$				<b>⊕</b>
MILLIG N	50	_									⊕ €	₽	_
Ξ									<b>⊕</b>		•		
<u>z</u>													
	0												لي
		76 77 7	78 79	80 8	1 82	83 8	4 85	86	87 8	8 89	90 9	1 92	93

WATER YEAR

250 -

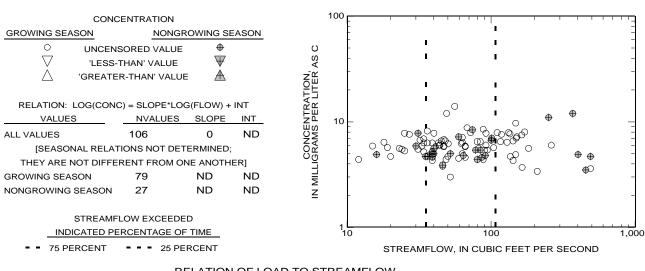
# Appendix 3 Total organic carbon

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD		100,000
× UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	<u>}</u>	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	PER D/	10,000
ALL VALUES 106 1.02 1.47	NDS	
— SMOOTHED RELATION BETWEEN LOAD AND FLOW	I POU	
(SHOWN IF THERE ARE 10 OR MORE VALUES)	λ Ε	1,000
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	9	
75 PERCENT 25 PERCENT		
		100 100 1,000
		STREAMFLOW, IN CUBIC FEET PER SECOND

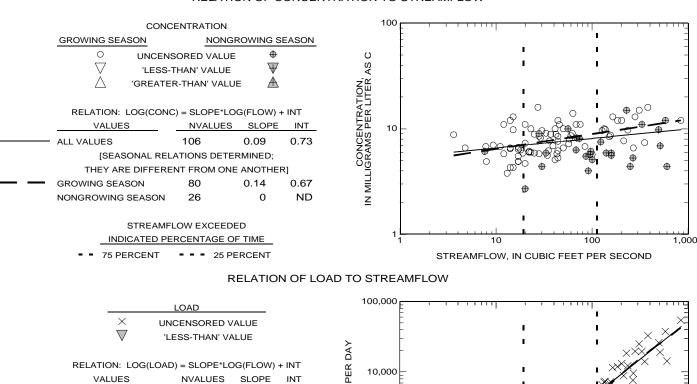
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			
LOW FLOW HIGH FLOW			
O UNCENSORED VALUE ♥  VILESS-THAN' VALUE   OF GREATER-THAN' VALUE	RATION, IR LITER AS C		-
TRENDS IN CONCENTRATION	ER LI	<u>;</u>	-
VALUES NVALUES NWYS SLOPE LOW FLOW 20 11 ND HIGH FLOW 25 11 ND	CONCENTI IN MILLIGRAMS PE 2		- ()
	Z	'F ○	J

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

ALL VALUES

LOW FLOW

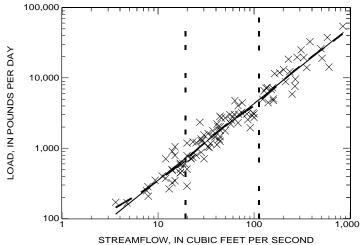
HIGH FLOW

106

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
0	UNCENSORE	O VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
$\triangle$ ,	GREATER-THA	N' VALUE	$\blacksquare$
TR	ENDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE

14

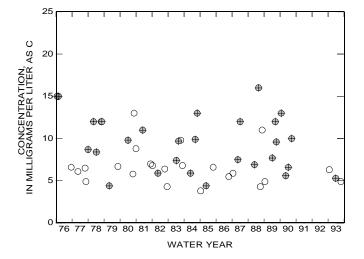
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ND

0

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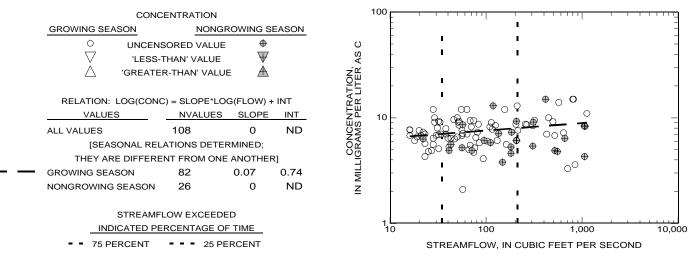
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# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMELOW

RELATION OF LOAD	TO STREAMFLOW
LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000 
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	10,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	Z 1,000 ×
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	100 100 1,000 10,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTE	RATION				ı	1	1 1	- 1	ı	1 1	'	1	1		,	1	1
LOW FLOW			HIGH FLOW															
0 UI	NCENSORE	D VALUE	<b>⊕</b>	AS C	20	_												
ا' 🗸	_ESS-THAN	l' VALUE	$\overline{\Psi}$	~~ ~														
△ 'GR	EATER-TH	AN' VALUE	<u> </u>	6 <u>H</u>														
				ĘΞ	15∉	<del>1))</del>									<b>⊕</b>			
TREN	DS IN CON	CENTRATI	ON	NTRAT PER LI	- 1	•		$\oplus$							*			
VALUES	NVALUES	NWYS	SLOPE	Äα		0								_				
LOW FLOW	26	14	ND	CONCER	10	_			4		0	<b>⊕</b>		•				
HIGH FLOW	25	14	0	OO R		_	<b>***</b>	)	Ф~д	7	<b>*</b>		(	$\mathcal{O}$	٥ _	⊕ €	<b>\Phi</b>	
				⋾		0	₩	0	9	00	Ф0		0	0	<b>⊕</b> 8	⊕ €	₽	
				N N	5	_	0	Φ.		0 (	) C	₩@#	<del>)</del>		•			
				Z			€	₽₩			O	-				<b>⊕</b>		

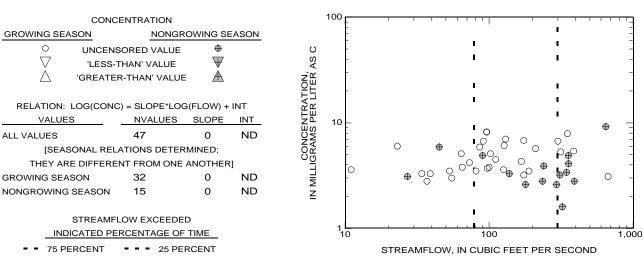
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# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	10,000 - I X X - I
ALL VALUES 47 1.02 1.33  — SMOOTHED RELATION BETWEEN LOAD AND FLOW	DO COMPOS
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	1,000 X X X X X X X X X X X X X X X X X X
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	100
	100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

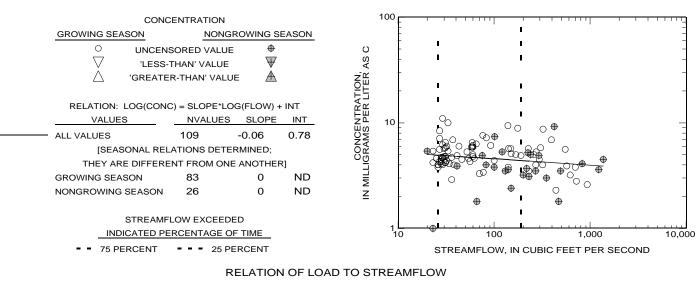
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			
LOW FLOW	HIGH FLOW	<b>+</b>	
○ UNCENSORED VALUE ○ 'LESS-THAN' VALUE △ 'GREATER-THAN' VALUE	ON A S S S S S S S S S S S S S S S S S S	- ⊕ ⊕	-
TRENDS IN CONCENTRATI	CONCENTRATION  ON  GONCENTRATION  FOR THE REALITIES  ON  ON  ON  ON  ON  ON  ON  ON  ON  O	<b>+</b> 0 0	_ _ _
LOW FLOW 12 7	ND ZA 4	• •	_
HIGH FLOW 12 6	ND SÖB HIFT SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	S ⊕ · · · · · · · · · · · · · · · · · ·	- & <del>-</del>

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD			100,000		•	
$\stackrel{ imes}{ riangledown}$	UNCENSORED \ 'LESS-THAN' VA			A \	1		- - - -
RELATION: LO	G(LOAD) = SLOPE*L0	OG(FLOW)	+ INT	10,000 E	1	×××××	_
VALUES	NVALUES	SLOPE	INT	10,000	. ×	X	1
ALL VALUES	109	0.94	1.51	NDS	· · · · · · · · · · · · · · · · · · ·	×××	=
— SMOOTHED RELA	ΓΙΟΝ BETWEEN LOAI	O AND FLO	DW .	Pou		< _	-
(SHOWN IF THERE	ARE 10 OR MORE V	ALUES)		Z 1,000		1	-
ST	REAMFLOW EXCEED	ED		OAE	× ×	1	=
INDICA	TED PERCENTAGE C	OF TIME		<b>-</b>		i	=
= = 75 PERC	ENT 25 P	ERCENT		-	1	I	-
				100	100	1,000	10,0
					STREAMFLOW,	IN CUBIC FEET PER SEC	OND

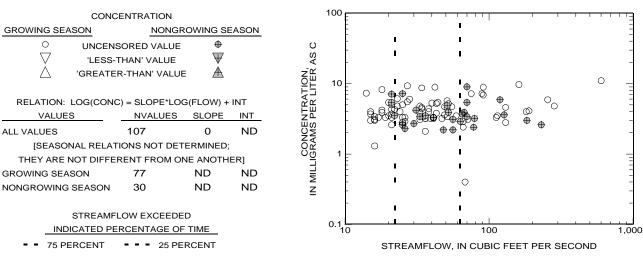
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		10		π		1 1	ı	1 1	ı	1 1	ı	1 1	
LOW FLOW	HIGH FLOW			<del>Ф</del>									
O UNCENSORED VALUE	——— S	8		Ψ									
√     'LESS-THAN' VALUE	₩ <												
△ 'GREATER-THAN' VALUE	CONCENTRATION, MILLIGRAMS PER LITER		<b>⊕</b>										
	E-1	6											
TRENDS IN CONCENTRATI	on Kr		<b>A</b> ⊕	Ф(	₽	$\oplus$		0					
VALUES NVALUES NWYS	SLOPE HØ		<b>₽</b> _⊕	<b>-</b>			0	Φ.			<b>⊕</b>		
LOW FLOW 8 7	ND SÃ	4		<b>+</b> +	-		- <sub>-</sub>	<b>+</b>	2			0	
<b>– – –</b> HIGH FLOW 31 14	-0.1 See			•			⊕ ⊕		<b>⊕</b> ∪'-			⊕	
	Ë				<b>⊕</b>		4	<del>)</del>		Ψ	₩		_
	Ē	2			Ψ	$\oplus$							
	Z			<b>⊕</b>									
			0										

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	OUNDS PER 10,000 PER 1 P
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	1,000 100 100 100 1,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

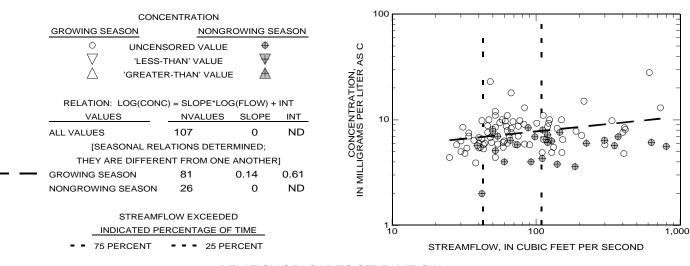
	CONCENTR	ATION				'		' '			' '	'	•				•
LOW FLOW			HIGH FLOW														
O UN	NCENSORE	D VALUE	<b>⊕</b>	S	20	_											
ינ 🗸 יו	ESS-THAN	VALUE	$\overline{\Psi}$	<													
△ 'GR	EATER-THA	N' VALUE	<u> </u>	NO.													
				<u>F</u> -	15	_											
TREN	DS IN CONC	ENTRATI	ON	ÄÄ													
VALUES	NVALUES	NWYS	SLOPE	Π. N.													
LOW FLOW	24	12	ND	CONCENTRATION. GRAMS PER LITER	10	_							•	. +			
HIGH FLOW	30	16	0	00.0 0.00			$\oplus$		0				4				
				Ξ.		€	₽	$\oplus$	0							<b>⊕</b>	
				₹	5	_	& <sup>⊕</sup>			•		0_				<b>⊕</b>	
				Z		Φ	•	₩ (		₽⊖€	വ വൈക	₩ Ø#	<b>€</b>	0	<b>*</b>		0
						0	•	Ψ	^	₽ ~		-0			# ₹	Þ	

STREAMFLOW, IN CUBIC FEET PER SECOND

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

× × ×	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  107  1.08  1.43  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  10,000  2  1,000	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	1,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

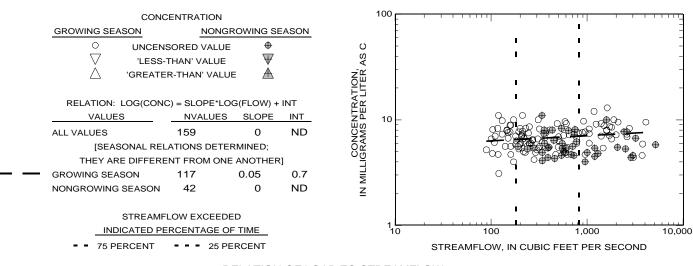
	CONCENTE	RATION				1 '	'	1	' '	'		'		
LOW FLOW			HIGH FLOW											
٥ ر	INCENSORE	D VALUE	<b>⊕</b>		יט 10 40	Ĺ								
$\nabla$	LESS-THAN	' VALUE	$\overline{\Psi}$		₹ '`									
△ 'GI	REATER-TH	AN' VALUI	E A	<u>N</u>	<u> </u>									
				A.	30	, _								
TREN	NDS IN CONC	CENTRAT	ION	μį	Ī									(
VALUES	NVALUES	NWYS	SLOPE	Ä,	N T									
LOW FLOW	19	11	ND	CONCEN	∑ ₹ 20	_								
HIGH FLOW	39	15	0	85	Y U									
					10			4	<del>)</del>					
					<u>≥</u> 10	) <del> </del>	,	₩	₽		<b></b> 4	<b>.</b>		
				:	Z	•	••••••••••••••••••••••••••••••••••••••	•	0	Ç.		SOUTH PROPERTY OF THE PROPERTY	•	Q

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# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	1,000,000	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	100,000 - 1	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	0AD, IN POO	
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	1,000	100 1,000 10,000
		STREAMELOW IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

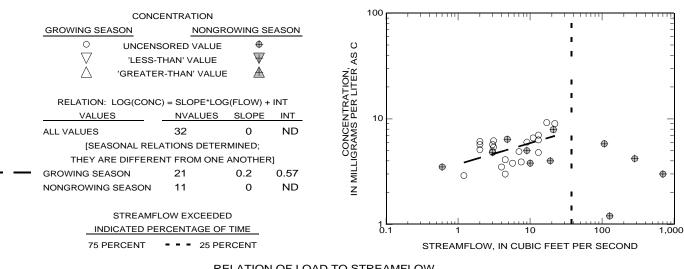
CONCENTRATION		23		-	1 1	1	1 1	1 1	1	1 1		
LOW FLOW  O UNCENSORED VALUE  VLESS-THAN' VALUE	GH FLOW	20	_									
☐ 'GREATER-THAN' VALUE  TRENDS IN CONCENTRATION		15	_				<b>+</b>					
VALUES NVALUES NWYS S LOW FLOW 26 14 HIGH FLOW 44 16	LOPE 0 0 0 0 O O O O O O O O O O O O O O O	10 ·	- °	⊕ ' ○ ⊕	<b>⊕</b>	8	o <sup>€</sup>	Ο Ψ	⊕ <sub>⊕</sub>	• •	0	⊕ , ⊕ ∯ ⊕

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# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT  25 PERCENT	100 100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

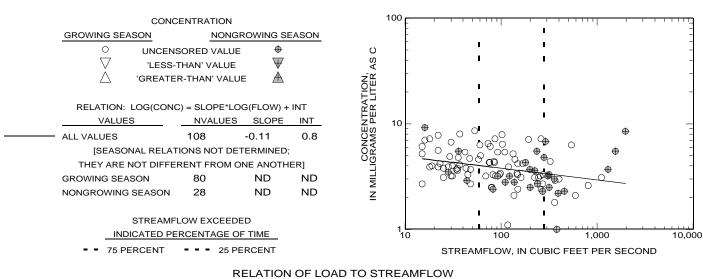
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	RATION			10		ı	1	1	1	1	1	1	1	1	1	ı	1	1	
LOW FLOW			HIGH FLOW																	
O UN	NCENSORE	D VALUE	<b>⊕</b>	AS C	8	_														
ן,	ESS-THAN	' VALUE	$\overline{\Psi}$		_															
△ 'GR	EATER-THA	AN' VALUE	<b>A</b>	TER,																
				누그	6															
TRENI	OS IN CONC	CENTRATI	ON	NTR/ PER	6	₽														
VALUES	NVALUES	NWYS	SLOPE	SE PN:																
LOW FLOW	0	0	ND	CONCER	4	_														
HIGH FLOW	4	3	ND	90 80																
							-	₽												
				Z Z	2															
				Z	_															
							#	<del>)</del>												

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD				100,000	1 1 1 1	1111		, IIII ,	<del>*</del>	1111
$\stackrel{\times}{ riangledown}$	UNCENSORED V 'LESS-THAN' VA			ΑΥ	-		I I	! !		<b>,</b>	
RELATION: LOG	G(LOAD) = SLOPE*LC	G(FLOW)	+ INT	R D	10,000		1	√aκ ′			_
VALUES	NVALUES	SLOPE	INT	PEF	10,000		ī	XXXX	×		
- ALL VALUES	108	0.89	1.53	NDS	F		×××				
SMOOTHED RELAT	ION BETWEEN LOAD	AND FLC	w	Pou	Ē	>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	×~~×			
(SHOWN IF THERE	ARE 10 OR MORE V	ALUES)		Ξ	1,000	~ × × × × × × × × × × × × × × × × × × ×	*****	Ī			-
STR	EAMFLOW EXCEED	ED		OAL	Ė		1 ×	I			
INDICAT	ED PERCENTAGE C	F TIME		_	-	^X					
75 PERCE	ENT = = 25 P	ERCENT			-	X	1	ı			
					100		100		1,000		10,0
						STREA	MFLOW IN	CUBIC F	EET PER SI	ECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			' ' '
LOW FLOW HIGH FLOW			
O UNCENSORED VALUE	TION, LITER A	8 - 9	) 0
VALUES NVALUES NWYS SLOPE  LOW FLOW 37 15 0  HIGH FLOW 19 12 ND	CONCE IN MILLIGRAMS		_ ⊕ 

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

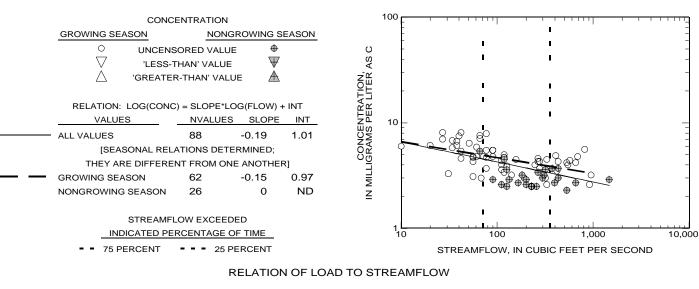
WATER YEAR

10 **-**

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  88  0.81  1.75	- F <b>I W</b> AXX
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	1,000
INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100 100 1,000 10,000
	30 100 1,000 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION

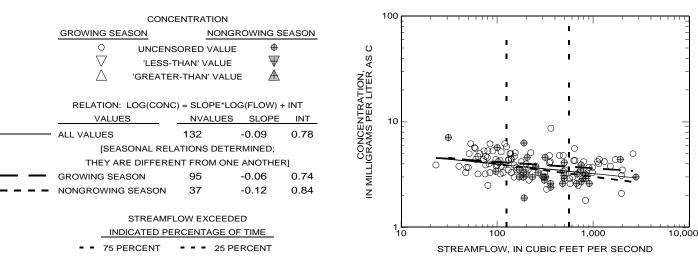
CON	CENTRATION							
LOW FLOW		HIGH FLOW						
O UNCE	NSORED VALUE	<b>⊕</b>	O S	_			0	4
√ 'LESS	S-THAN' VALUE	$\overline{\Psi}$	⋖			0 0	_	
△ 'GREAT	ER-THAN' VALU	<b>E          </b>	ομ N			0	8	0
			Ē5. (	_		O	8	a
TRENDS I	N CONCENTRAT	ION	Σ. Σ.				•	(4)
VALUES NV.	ALUES NWYS	SLOPE	Ξ.V.				$\oplus \oplus$	00
LOW FLOW 2	24 7	ND	CONCENTRATION. LIGRAMS PER LITER	_		_ ⊕ ♣	<b>.</b>	₩ _
HIGH FLOW 1	8 6	ND	00 80			• ~	•	
			- 1			• •	O <b>**</b>	₩
			W WILL	_		Φ Ψ	44	
			<u>z</u>					
			'	76 77 78 79	9 80 81 82 83 84 85	86 87 88 89	90 91	92 93

WATER YEAR

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD				100,000		•	×	<del></del>
$\stackrel{ imes}{ riangledown}$	UNCENSORED V 'LESS-THAN' VA			<b>۸</b>	-		· ·	ŽŽ.	
RELATION: LOG	(LOAD) = SLOPE*LC	G(FLOW)	+ INT	ER D.	10,000	i	ı X	•	
VALUES	NVALUES	SLOPE	INT	PE	10,000	i			
ALL VALUES	132	0.91	1.51	DS	E	`	(XXXXX)		
	ON BETWEEN LOAD ARE 10 OR MORE V		)W	D, IN POL	1,000	×	, , , , , , , , , , , , , , , , , , ,		
STR	EAMFLOW EXCEED	ED		Ŏ.	F	×	· ·		
INDICAT	ED PERCENTAGE C	F TIME		_	F				
75 PERCE	NT = = 25 P	ERCENT			-	ı			
					100	100	1,0	000	10
						STREAMFLOW	, IN CUBIC FEET P	ER SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

		10		$\overline{}$	_	$\neg$	$\neg$			$\overline{}$	$\overline{}$	$\neg$	$\neg$	$\neg$	$\neg$	$\neg$			$\overline{}$
CONCENTRATION																			
LOW FLOW HIGH FLOW																			
○ UNCENSORED VALUE	S	8																	
√ 'LESS-THAN' VALUE  √	⋖	Ü																	
	JON, TER					C	)												
	Ě5	6				(	$\infty$							0					
TRENDS IN CONCENTRATION	TR/	Ü				0				`		0	0					8	)
VALUES NVALUES NWYS SLOPE	ΩN.					$\cap$				) 7								U	4
LOW FLOW 41 13 ND	CONCENT MILLIGRAMS PI	4		0	₽	0		_	, <del>(</del>	,	(		₽@		<b>+</b>	₩	, +	_	0
HIGH FLOW 34 13 ND	ÖΆ	7				_	0		)		_	У). Г	<b>⊕</b>	4		⊕	)	•	₽
				0	÷		0		$\oplus$	<b></b>	0	,			_ ⊘ ⊕	⊕ .	₽⊕ €	<b>₩</b>	•
	₹	_			$\oplus$			0		Ф	0			*	#		<b>⊕</b>		4
	Z	2	_					$\oplus$		Ψ	,								
	_																		

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION				100		_
GROWING SEASON	NONGR	OWING S	EASON		‡	. 1	
O LINCENS	ORED VALUE	<b></b>		O	ţ	1	
	HAN' VALUE	₩		Ŋ,	+	1	
, ^	R-THAN' VALUE			<del>-</del> Σα	-		
△ GREATER	K-THAN VALUE			호핀		1	
RELATION: LOG(CONC	) - SI OBE*I OC	YEL ()\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	INIT	YA L		1 1	
VALUES	NVALUES	SLOPE	INT	CONCENTR GRAMS PER		I	
				SEN	10 –	- A I O O O	
ALL VALUES	80	0	ND	S≥	F		
[SEASONAL RELA	ATIONS DETER	MINED;		Ö₽	10	A CONTRACTOR SO A COM	
THEY ARE DIFFERE	NT FROM ONE	ANOTHER	۲]	-	-		
GROWING SEASON	57	0	ND	N MIL	-	• • • • • • • • • • • • • • • • • • • •	
NONGROWING SEASON	23	0	ND	z			
				=	Ī	ı	
STREAMFL	.OW EXCEEDE	D				1 I	
INDICATED PEI					100	1,000	1
					100	*	
75 PERCENT	25 PEI	RCENT				STREAMFLOW, IN CUBIC FEET PER SECOND	

#### RELATION OF LOAD TO STREAMFLOW

	LOAD				1,000,000	1 1		<del> </del>	<del></del>
$\stackrel{ imes}{ riangledown}$	UNCENSORED V			ΑΥ	Ē	1	1 1	! !	
RELATION: LOG	(LOAD) = SLOPE*LO	G(FLOW)	+ INT	ER D	100,000	ı	1	. ×_	<u>,</u> ]
VALUES	NVALUES	SLOPE	INT	砬	100,000	ı	•	XX	^ =
ALL VALUES	80	0.96	1.57	ONDS	Ē			×	=
SMOOTHED RELATI	ON BETWEEN LOAD	AND FLO	W	Ō	-		×××××××××××××××××××××××××××××××××××		-
(SHOWN IF THERE A	ARE 10 OR MORE V	ALUES)		Ď,	10,000			!	
STR	EAMFLOW EXCEED	ED		Ŏ.	F		`	•	=
INDICAT	ED PERCENTAGE C	F TIME			[ *	×.	•		]
75 PERCE	NT = = 25 P	ERCENT			-	1	1		-
					1,000	1 1	1,000	<u> </u>	10,000
						STREAM	MFLOW, IN CUBIC FE	EET PER SECO	ND

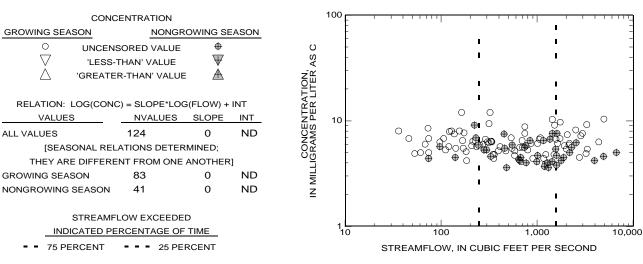
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		1
LOW FLOW HIGH FLOW		○ ⊕
O UNCENSORED VALUE ♥  VILESS-THAN' VALUE ▼  OREATER-THAN' VALUE ★  TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	ENTRATION, S PER LITER AS C 9 8	
LOW FLOW 21 6 ND HIGH FLOW 16 4 ND	CONCE IN MILLIGRAMS	

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

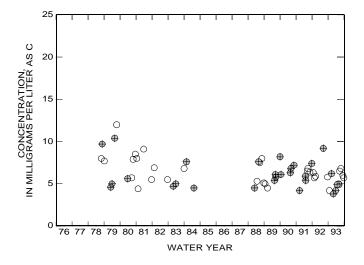


#### RELATION OF LOAD TO STREAMFLOW

	LOAD				1,000,000	<del>-                                    </del>		<del></del>	
$\stackrel{ imes}{ abla}$	UNCENSORED V 'LESS-THAN' VA			Α	- - - -		1	i	× =
RELATION: LOG VALUES	G(LOAD) = SLOPE*LC NVALUES	OG(FLOW) SLOPE	+ INT INT	PER D	100,000		1		
ALL VALUES	124	0.98	1.57	NDS	Ē		· · · · · · · · · · · · · · · · · · ·		=
SMOOTHED RELAT	ION BETWEEN LOAD	O AND FLC	w	POL	-		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		-
(SHOWN IF THERE	ARE 10 OR MORE V	ALUES)		Ž Ć	10,000		XXXX	ı	
	REAMFLOW EXCEED TED PERCENTAGE C			LOA	Ē		, i	1	=
75 PERCI	ENT <b></b> 25 P	ERCENT			1,000	100	I 1	I I,000	10,000
							, IN CUBIC FEET		-,

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

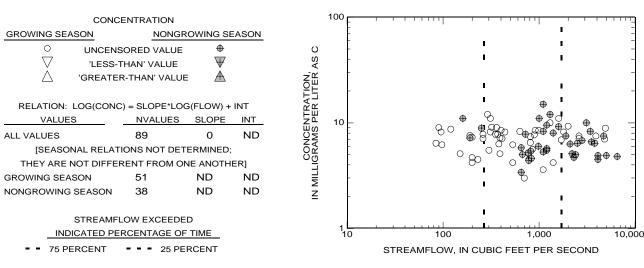
	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>⊕</b>
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	33	11	ND
HIGH FLOW	28	11	ND



# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

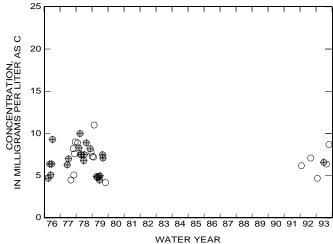


#### RELATION OF LOAD TO STREAMFLOW

	LOAD				1,000,000			<del>,</del>	<del></del>
$\stackrel{ imes}{ riangledown}$	UNCENSORED V			ΑΥ	- - -		1	; ;	
RELATION: LOG VALUES	(LOAD) = SLOPE*LO NVALUES	G(FLOW) SLOPE	+ INT INT	PER D	100,000		1		
ALL VALUES	89	0.98	1.63	UNDS	-		·	***	=
- SMOOTHED RELATI	ON BETWEEN LOAD	AND FLO	w	РО	-		XXX	<b>**</b> × <b>,</b>	-
(SHOWN IF THERE	ARE 10 OR MORE VA	ALUES)		Ď,	10,000		XXXX	× 1	
	EAMFLOW EXCEED			ГО			<b>⋌</b> ፠ı	ı	=
75 PERCE	ENT <b>= = 2</b> 5 PI	ERCENT			1,000	100		1 000	10,000
					10	100 STREAMFLOW,	IN CUBIC FE	1,000 EET PER SECO	10,000 OND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

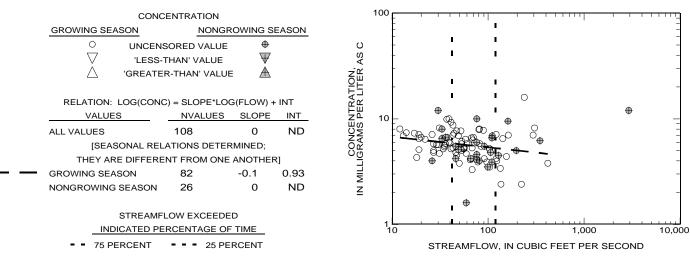
	CONCENTR	ATION		
LOW FLOW			HIGH FLOW	
O и	INCENSORE	D VALUE	<b>⊕</b>	
$\triangle$	'LESS-THAN'	VALUE	$\overline{\Psi}$	
△ 'GI	REATER-THA	N' VALUI	■ ▲	Ŏ
				RATIO
TREN	NDS IN CONC	ENTRAT	ION	Ę
VALUES	NVALUES	NWYS	SLOPE	Ä
LOW FLOW	16	5	ND	OONCENT
HIGH FLOW	23	5	ND	8



# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMELOW

RELATION OF LO	OAD TO STREAMFLOW
LOAD	1,000,000
× UNCENSORED VALUE	* * * * * * * * * * * * * * * * * * *
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	100,000 L
ALL VALUES 108 0.97 1.53	δη 25 10,000 = ×
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	1,000
75 PERCENT 25 PERCENT	100 1,000 10,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

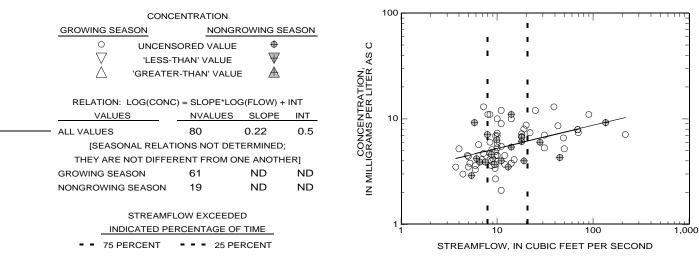
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			1 ' '			
LOW FLOW	HIGH FLOW					
O UNCENSORED VALUE	<b>⊕</b>	ပ ဖု 20	0			_
√	$\overline{\Psi}$	_∢				
△ 'GREATER-THAN' VALUE	■ ▲	ΘË				
		F . 15	5 —	<b>⊕</b>		_
TRENDS IN CONCENTRATI	ON	ZE,				
VALUES NVALUES NWYS	SLOPE	SEN	<b>⊕</b>	0		
LOW FLOW 34 15	0	CONCENTRATION GRAMS PER LITER	o - 0		0	_
HIGH FLOW 18 11	ND	08 8	•	0 0	0	
		⊐	000	or_(U) :	o 8 0 €	_ ⊕
		N MI	5 - 0 0 0	, o , •	0 0	• • •
		<b>∠</b>	0	⊕○ ⊕	<b>•</b>	Ψ Ψ
			<b>⊕</b>		<b>⊕</b>	

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE  >	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  SLOPE INT  ALL VALUES  80  1.22  1.23  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100 100 100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

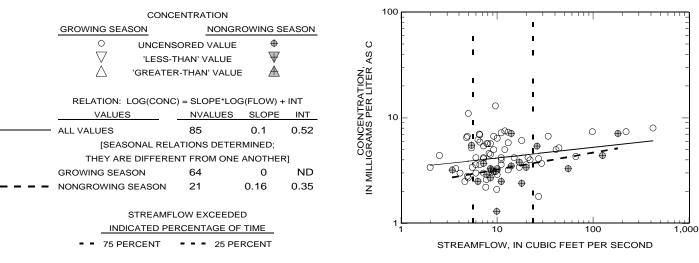
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		1		
LOW FLOW	GH FLOW			
○ UNCENSORED VALUE  VLESS-THAN' VALUE  GREATER-THAN' VALUE	ATION, AS TO THE			
	A HA	<b>+</b>	<b>⊕</b>	O <b>•</b>
LOW FLOW 19 10 HIGH FLOW 16 11	ND ND ND ND STATE NO ND	⊕ ○ ⊕ ○ - · · •	• **	+ + 0 0 0 0

# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	LOAD			100,000			<del>                                     </del>
$\stackrel{ imes}{ riangledown}$	UNCENSORED VAL		<b>&gt;</b>	- - -	] 		<b>'</b> م
RELATION: LOG VALUES	(LOAD) = SLOPE*LOG( NVALUES S	(FLOW) + INT SLOPE INT	PER DAY	10,000		. >	
- ALL VALUES	85	1.1 1.25	JNDS	1,000 =	•		
SMOOTHED RELATI	ON BETWEEN LOAD A	ND FLOW	PO	Ē	' ×		
(SHOWN IF THERE	ARE 10 OR MORE VALU	JES)	Z	-	×	×	
	EAMFLOW EXCEEDED  ED PERCENTAGE OF		LOAD,	100			
= 75 PERCE				E	×	1	
				10	10	10	00
					STREAMFLOV	/, IN CUBIC FEET F	PER SECONI

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

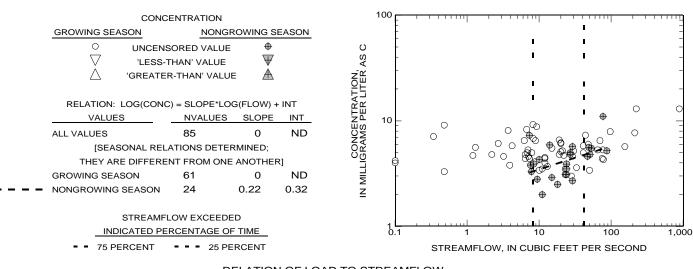
					25										
	CONCENT	RATION			25		ı	1	1					1	Т
LOW FLOW			HIGH FLOW												
O UI	NCENSOR	ED VALUE	<b>⊕</b>	8	20										
	LESS-THAI	N' VALUE	$\overline{\Psi}$	Š											
△ 'GR	REATER-TH	HAN' VALUE	<b>A</b>	NO.											
				R LI	15	L									
TREN	DS IN CON	ICENTRATI	ON	<b>た</b> 説											
VALUES	NVALUES	S NWYS	SLOPE	Ω N											
LOW FLOW	14	9	ND	CONCE	10	_							0		
HIGH FLOW	14	11	ND	OO RO											
				Ė					€	₽					$\circ$
				MILL	5	L			<b>P</b>	)	^				_
				Z					-	600	00	$\cap \Phi$	_	$\oplus$	

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# APPENDIX 3. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL ORGANIC CARBON 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

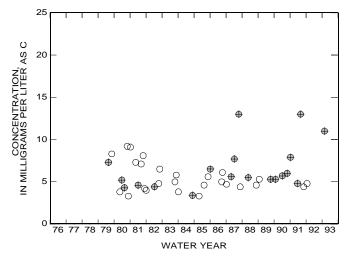


#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	100,000 - I I I I I I I I I I I I I I I I I
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	1,000 IN DONNON DE LO DE LO DE LO DE LO DEL
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION										
LOW FLOW			HIGH FLOW							
Ο υ	NCENSORE	D VALUE	<b>+</b>							
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$							
△ 'GF	REATER-THA	N' VALUE	■ ▲							
TREN	IDS IN CONC	ENTRAT	ION							
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	26	13	ND							
HIGH FLOW	19	12	ND							



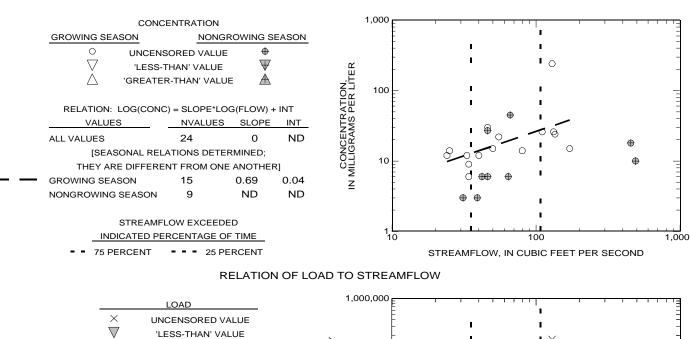
# Appendix 4 Suspended sediment

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



 RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

 VALUES
 NVALUES
 SLOPE
 INT

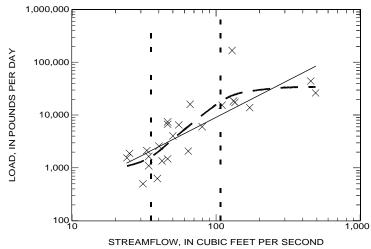
 ALL VALUES
 24
 1.4
 1.16

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
0	UNCENSORE	O VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
△ '(	GREATER-THA	'N' VALUE	■ ▲
TRE	ENDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE

7

4

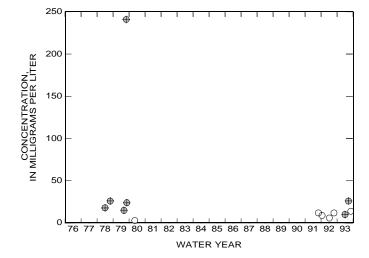
3

ND

ND

LOW FLOW

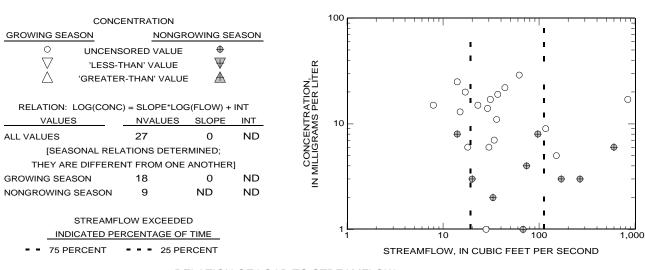
HIGH FLOW



# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD			100,000	<del>-                                    </del>	<del></del>	<del></del>
	DRED VALUE HAN' VALUE	<u>}</u>	-		; ;	
RELATION: LOG(LOAD) = SLO VALUES NVAI	, ,	INT H	10,000		· × ·	
— ALL VALUES 27 — SMOOTHED RELATION BETWEE	0.85	1.87 SON O	-	_	× × ×	××
(SHOWN IF THERE ARE 10 OR M		AD, IN	1,000	, ,	× I	_
STREAMFLOW E  INDICATED PERCENT	TAGE OF TIME	PO PO	Ē		$\stackrel{\frown}{\times}$ $\times$ $\times$	<u>-</u>
75 PERCENT	25 PERCENT		100	10	100	1,0
				STREAMFLOW.	IN CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	29   1   9   1   1   1   1   1   1   1
LOW FLOW HIGH FLOW	
○ UNCENSORED VALUE   □	<sub>γ</sub> 20 - Ο
∀     'LESS-THAN' VALUE	15 - 01 - 02 - 03 - 03 - 03 - 03 - 03 - 03 - 03
	OK F
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	Ϋ́Θ Ϋ́Θ ΕΣ
LOW FLOW 6 3 ND	CONCENTR LIGRAMS 10 - 01
HIGH FLOW 6 4 ND	⊕ WILLI
	Z 5

0

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

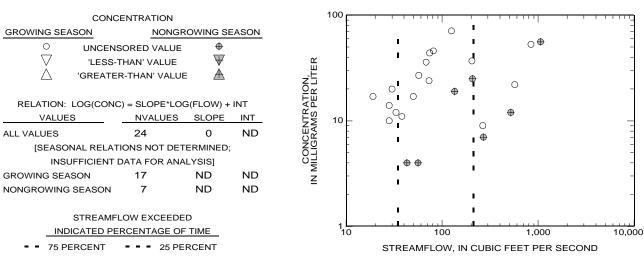
0

25 -

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

$egin{array}{ccc} & LOAD & & & & & & & & & & & & & & & & & & &$	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         24         1.23         1.54	4 100,000 X X X X X X X X X X X X X X X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	0 1,000
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	100 <sub>10</sub> 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			100			ı	1 1	1		1	1 1	- 1	1	1 1	
LOW FLOW			HIGH FLOW	, =													
$\bigvee_{\wedge}$	JNCENSOREI 'LESS-THAN' REATER-THA	VALUE	⊕ ₩ Æ	CONCENTRATION, IN MILLIGRAMS PER LITER	80	_											_
TREN	NDS IN CONC	ENTRAT	ION	AATIO	60	_	$_{\oplus}^{\oplus}$										-
VALUES	NVALUES	NWYS	SLOPE	N N			₩										
LOW FLOW	5	3	ND	S C C C C C C C C C C C C C C C C C C C	40	_											
HIGH FLOW	6	4	ND	ES													
				~\sqrt{\sq}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}			•										
				2	20	_	•										0
								₽								਼ਰ	₽
					0	76 77	78 79	80 81	82.8	3 84	85.8	6 87	88 2	Ra a	0 91	92 0	13
						10 11	10 19	00 01	02 (	5 04	00 0	0 01	00 (	,, ,	0 91	J2 3	,,,

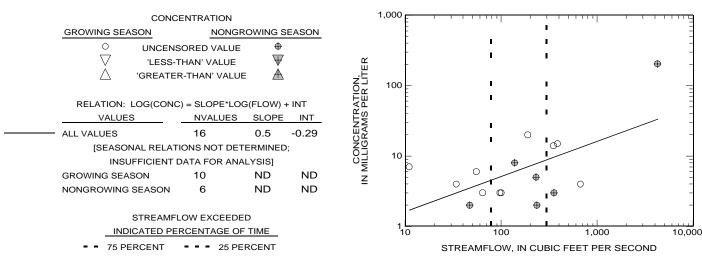
WATER YEAR

100 -

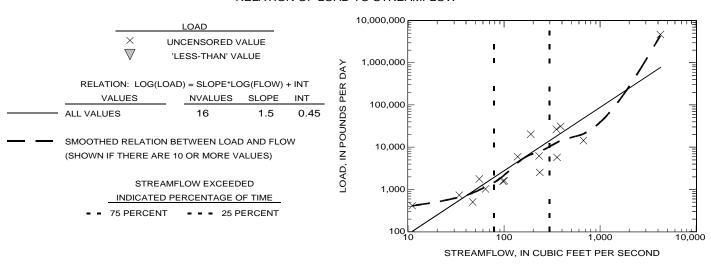
# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**



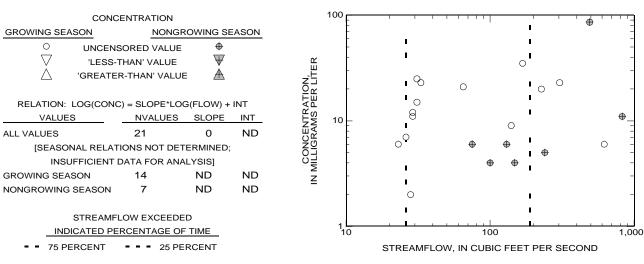
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			250		1 1	1 1	ı	ı	ı	1	ı		ı	ı	1	
LOW FLOW			HIGH FLOW															
, ^	NCENSOREI LESS-THAN' REATER-THA	VALUE	⊕ ₩ Æ	ON, LITER	200	_	0											_
TDEN		ENTRAT	ON	ATION, PER LIT	150	_												_
VALUES	IDS IN CONC NVALUES	NWYS	SLOPE_	AMS														
LOW FLOW	5	4	ND	NCE IGR/	100	_												_
HIGH FLOW	5	4	ND	CONCENT														
				Ž	50	L												_
					0						1						o <sup>(</sup>	⊕ ##₽

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	1,000,000 F
LOAD  × UNCENSORED VALUE	
√ 'LESS-THAN' VALUE  RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	Y 100,000
VALUES NVALUES SLOPE INT	- " ×i × ×i × ^ = 1
———— ALL VALUES 21 1.15 1.46	10,000 × × × × × × × × × × × × × × × × ×
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	NA XX XX I
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	1,000 P
75 PERCENT 25 PERCENT	100 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

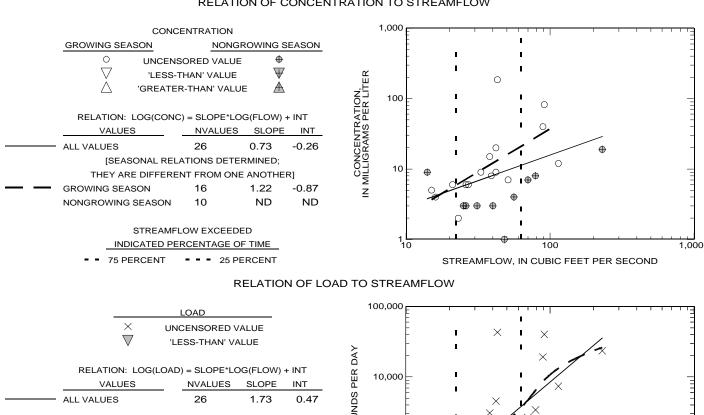
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	,	00			ı	1	1	7			- 1	- 1		Т
LOW FLOW HIGH FLOW				$\oplus$										
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ★	Ë.	80 –		Ψ										
TRENDS IN CONCENTRATION VALUES NVALUES NWYS SLOPE	SPA	60 –												
LOW FLOW 2 2 ND HIGH FLOW 6 3 ND	CONCENT IN MILLIGRAM	40 —												
	Z	20		$\oplus_{\bigoplus}$										
				<b>⊕</b>									0	•

## APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

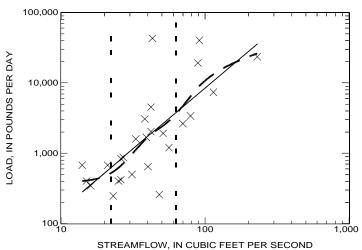
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

> STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME 75 PERCENT 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION									
LOW FLOW			HIGH FLOW						
٥ ر	JNCENSOREI	O VALUE	<b>+</b>						
$\nabla$	√ 'LESS-THAN' VALUE								
	REATER-THA	N' VALUE	■ ▲						
TRE	NDS IN CONC	ENTRATI	ON						
VALUES	NVALUES	NWYS	SLOPE						

6

3

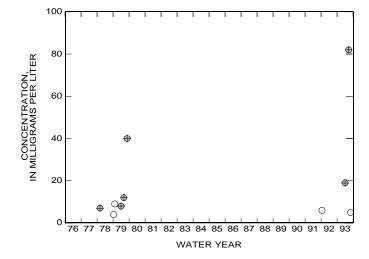
3

ND

ND

LOW FLOW

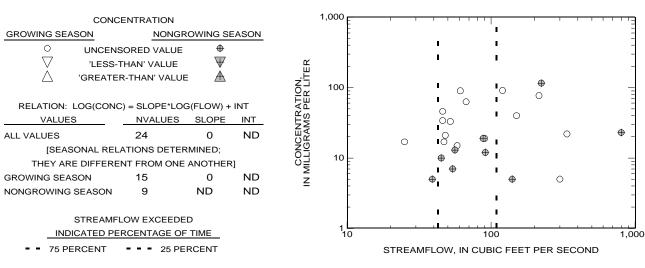
HIGH FLOW



# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	OONDO LANGE TO THE PROPERTY OF
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	1,000 1,000 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

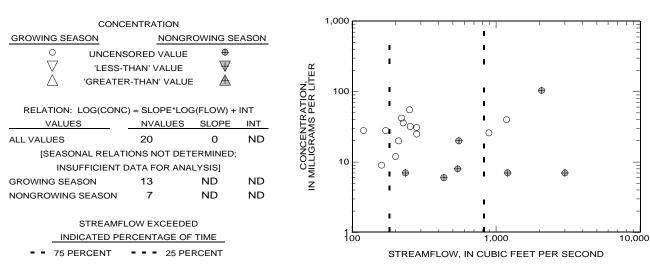
	CONCENTE	RATION			250		ı	ı	I	ı	ı	1	ı	ı	-	1	ı	-	ı	
LOW FLOW			HIGH FLOW																	
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	~	200	_														
$\nabla$	LESS-THAN	' VALUE	$\overline{\Psi}$	ËR																
△ 'GF	REATER-TH	AN' VALUE	■ ▲	ž5																
				음골	150															
TREN	IDS IN CON	CENTRAT	ION	S.A.	.00															
VALUES	NVALUES	NWYS	SLOPE	CONCENTRATION, MILLIGRAMS PER LIT				<b>⊕</b>												
LOW FLOW	2	2	ND	38.5	100	_		•												
HIGH FLOW	8	3	ND	ĘŠ																
				Ŭ≣					Φ											
				Z	50															
								0	)											
								<b>⊕</b>	Ф											

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

## APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	LOAD				10,000,000	T	1 1 1	<del> </del>	1 1	
$\stackrel{ imes}{ riangledown}$	UNCENSORED VA			>	-	I I		I I		
RELATION: LOG(I	LOAD) = SLOPE*LO	G(FLOW)	+ INT	ER DA	1,000,000			ı	×	_
VALUES	NVALUES	SLOPE	INT	PER	F	ı		1 ×	_ >	
ALL VALUES	20	0.95	2.16	SOZ				× /		
SMOOTHED RELATION (SHOWN IF THERE AR			w	), IN POUI	100,000	>	× ×	ı ×		-
STRE	AMFLOW EXCEEDS	≣D		OAL	10,000	$\times_{L} \times$	×	ı		-
INDICATE	D PERCENTAGE O	F TIME		_	Ē			ı		
75 PERCEN	NT = = = 25 PE	ERCENT			-	1		Ī		
					1,000			1,000		10,
							EAMFLOW.	IN CUBIC FI	EET PER SE	COND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			250		1 1		ı			ı	-	1	1	ı	ı	
$\nabla$	JNCENSOREI 'LESS-THAN' REATER-THA	D VALUE	HIGH FLOW	ATION. PER LITER	200	-												-
TRE	NDS IN CONC	ENTRAT	ION	RATIO S PER	150	-												-
VALUES LOW FLOW HIGH FLOW	NVALUES 3 5	NWYS 2 3	SLOPE ND ND	CONCENTR	100	_	•	₽										_
				Z Z	50	_		<b>⊕</b>										_
					0	76 77	78 7	9 80	81 82	2 83	84 8	5 8	6 87	7 88	89	90	91 9	○ ∰ 12 93

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION				100	<del> </del>	1		<del>-                                    </del>		Т
VING SEASON	NONGR	OWING SEA	ASON		ŧ				ı		
LESS-T	ORED VALUE 'HAN' VALUE R-THAN' VALUE	<b>⊕</b>		ATION, PER LITER	‡ †				1		
ELATION: LOG(CONC	) = SLOPE*LOG NVALUES	G(FLOW) + I SLOPE	NT INT_		10 -	<b>⊕</b>			1 1	0	
VALUES	15	0	ND	CONCENTR IN MILLIGRAMS	Ē			<b>⊕</b>	_		
[SEASONAL RELATI	ONS NOT DET	ERMINED;		<u>2</u> 9	ţ			0			
INSUFFICIENT D	ATA FOR ANA	LYSIS]		ŏ⋥	+			$\circ \infty$	•		
WING SEASON	10	ND	ND	z	+			<b>⊕</b>	•		
GROWING SEASON	5	ND	ND	_	-	0	0	<b>©</b> O	ı		
STREAMFL INDICATED PER	OW EXCEEDE				1 0.1		<del></del> 0	10	100		_
75 PERCENT	25 PE	RCENT				STREAM	/IFLO	W, IN CUBIC	FEET PER SE	COND	

#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  15  1.17  1.12  SNOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10 X X Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y

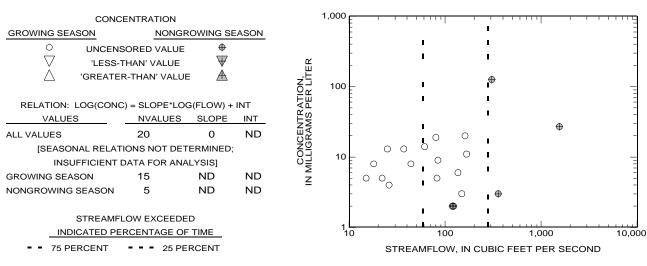
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				25	I	T	ı	ı	<del></del>	ı	1		1	-	1	-	1	
	NCENSOREI 'LESS-THAN' REATER-THA	VALUE	HIGH FLOW	_	ION, R LITER	20	_													_
VALUES LOW FLOW	IDS IN CONC NVALUES 0 1	ENTRATI NWYS 0 1	ON SLOPE ND ND		CONCENTRATION, IN MILLIGRAMS PER LITER	10														<b>+</b>
HIGH FLOW	'	·	ND		IN MICI	5	_													_
						0	76 7	7 78	79 8	0 81	82 8	33 84	85	86	87	88 8	39 9	90 9	92	93

### APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         20         1.23         1.2	10,000 L X X L X X L X X L X X X X X X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	NO I NOOD
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	100 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				250		1 1	- 1	-	1 1		1	1	1	1	1	1	T		$\neg$
LOW FLOW	CONCENTIO	ATION	HIGH FLOW	-																	
$\overline{}$	NCENSORE		₩		R	200	_														-
Ň	REATER-THA		A		ATION, PER LITER																
TREN	IDS IN CONC	ENTRAT	ION			150	_														=
VALUES	NVALUES	NWYS	SLOPE		CONCENTE IN MILLIGRAMS				<b>⊕</b>												
LOW FLOW	7	4	ND			100	_														-
HIGH FLOW	3	2	ND		ᅙ																
					Σ																
					≥	50	_														-
									<b>⊕</b>												
						_		. 9	28										. с	Ω	40
						0	76 7	7 78	79 8	0 81	82	83 8	34 8	5 8	6 8	7 88	89	90	91	92	93

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION				100 F		ı	<del></del>	
GROWING SEASON	NONGE	ROWING SE	ASON		F			ı	=
O UNCENS	ORED VALUE	<b></b>			F	ı		I	_
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$		H R	F	ı		ı	_
△ 'GREATE	R-THAN' VALUI			Ž T T	t	ı		Ī	-
				드	Ī	1		1	_
RELATION: LOG(CONC	() = SLOPE*LO	G(FLOW) +	INT	Α					
VALUES	NVALUES	SLOPE	INT	ËS	10 —	_		•	_
ALL VALUES	1	ND	ND	CONCENTRATION, N MILLIGRAMS PER LIT	Ē	1 1	_	ī	=
[SEASONAL RELAT	IONS NOT DET	ERMINED;		공익	t		0		
INSUFFICIENT I	DATA FOR ANA	LYSIS]		SI	-			•	-
GROWING SEASON	1	ND	ND	Z	-	•		•	-
NONGROWING SEASON	0	ND	ND	=	-	•			_
		_				ı		ı	
STREAMF	OW EXCEEDE	:D			1				
INDICATED PE	RCENTAGE OF	TIME			10	100			1,000
■ ■ 75 PERCENT	25 PE	RCENT				STREAMFLOW, IN CUBIC F	EET PER	SECOND	

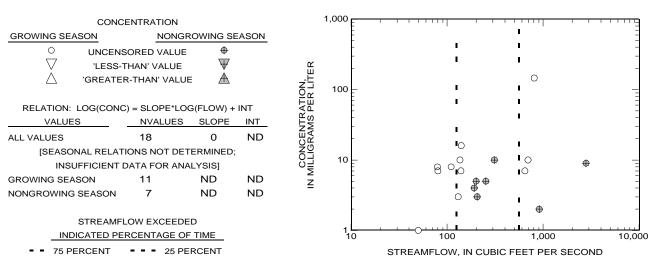
#### RELATION OF LOAD TO STREAMFLOW

						100,000					
		LOAD				· F					
	$\times$	UNCENSORED \	/ALUE			ļ.	ı	1		·	1
	$\nabla$	'LESS-THAN' V	ALUE			<b>-</b>					-
					DΑ	Ī	'			•	1
RELATIO	ON: LOG	(LOAD) = SLOPE*LO	OG(FLOW)	+ INT	Ω Π	Ī	·	•			1
VAI	LUES	NVALUES	SLOPE	INT	PE	-		<u>.</u>			-
ALL VALUE	S		ND	ND	DS						
					Ξ	10,000 —	·	•		•	_
SMOOTHER	RELATI	ON BETWEEN LOA	D AND FLC	w	ŏ	E			×	_	3
(SHOWN IF	THERE A	ARE 10 OR MORE V	ALUES)		Z	-			^	-	-
(6116771711	E.	THE TO OIL MOILE V	(LOLO)		<u> </u>					ı	1
	CTD	EAMFLOW EXCEED	)ED		)A[	_	1			I	
					2		ļ				
_	INDICAT	ED PERCENTAGE (	JF TIME			T T				ı	-
7	5 PERCE	NT 25 F	PERCENT				!			ı	
						1,000		100			1,000
							STREAMFLOW, IN	CUBIC FEE	ET PER S	SECOND	

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD		1,000,000	<del>- , , , , , , , , , , , , , , , , , , ,</del>		
× UNCENSORED VALUE		F			=
LESS-THAN' VALUE		<u>,</u>	· I	· I	
		100,000			/×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOV	V) + INT	K. [	I	1	
VALUES NVALUES SLOPE			ī		=
ALL VALUES 18 1.33	0.77	SQ -	-	. ×/^	-
		<b>5</b> 10,000 ⊨	×	$\sim$ $\sim$	=
SMOOTHED RELATION BETWEEN LOAD AND F	LOW	2	×		3
(SHOWN IF THERE ARE 10 OR MORE VALUES)		Z -	*/~	*	7
		ģ	, î		1
STREAMFLOW EXCEEDED		1,000	<i>1</i> .		
INDICATED PERCENTAGE OF TIME	_	<b>-</b>	/		3
75 PERCENT 25 PERCEN	г	Ļ	×	ı	1
		100	100	1,000	10,000
			STREAMFLOW,	IN CUBIC FEET PER	SECOND

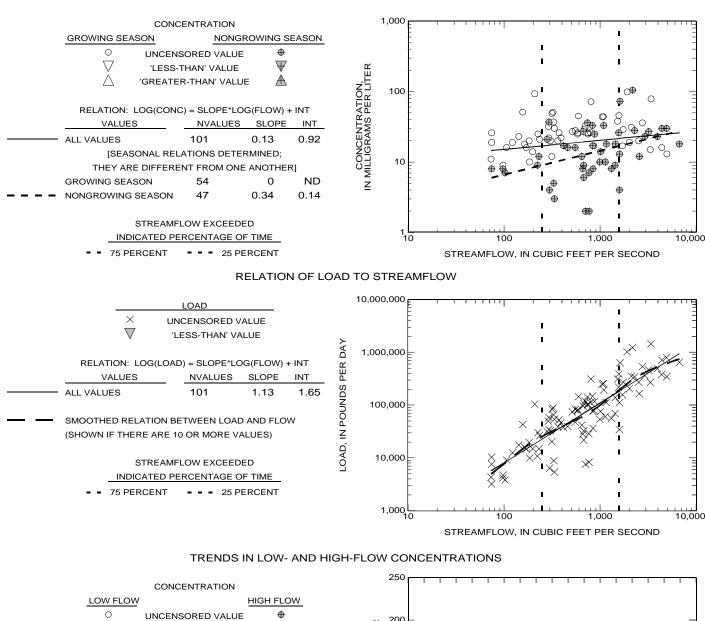
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				250		1	1 1	1	1	1 1	-	-	1	Т		ı	-	
LOW FLOW			HIGH FLOW	<u>-</u>																
$\bigvee_{\Lambda}$	INCENSOREI 'LESS-THAN' REATER-THA	VALUE	⊕ ₩ ± <u>A</u>	-	PER LITER	200	_													-
TREN	IDS IN CONC	ENTRAT	ON		Υ (Λ	150	_		<b>⊕</b>											_
VALUES	NVALUES	NWYS	SLOPE	<u>!</u>	ZΫ															
LOW FLOW	4	3	ND	Š	CONCENT	100	_													_
HIGH FLOW	5	3	ND	Ś	בָּׁב															
				`	ັ≣															
					Z	50	_													_
						0	76 7	7 78	79 80	0 81	82	83	84 8	85 8	6 8	7 88	8 89	90	91 9	<u>∞</u> 92 93

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



√ 'LESS-THAN' VALUE									
△ 'GREATER-THAN' VALUE									
TRENDS IN CONCENTRATION									
VALUES	NVALUES	NWYS	SLOPE						

10

12

ND

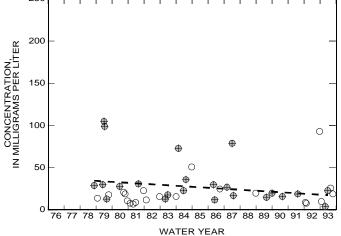
-1.17

21

23

LOW FLOW

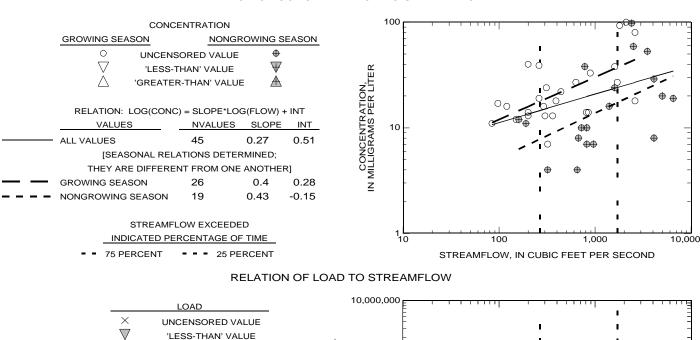
HIGH FLOW



# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



X UNCENSORED VALUE

VLESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

VALUES

NVALUES

NVALUES

SLOPE INT

ALL VALUES

45

1.27

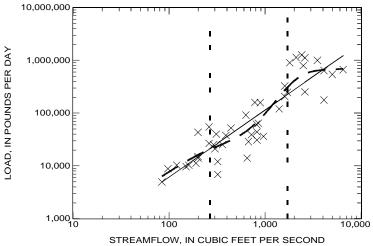
1.25

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

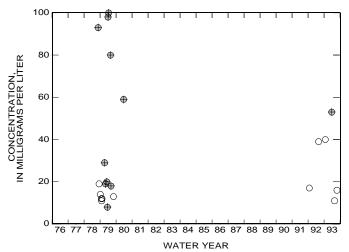
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW	<u> </u>	HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$ ,	GREATER-THAN' VALUE	$\triangle$
TR	ENDS IN CONCENTRATION	ON

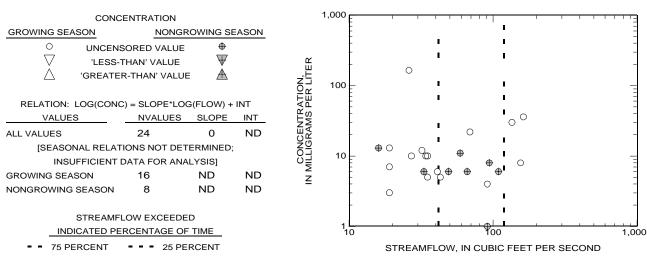
TREINDS IN CONCENTRATION												
VALUES	NVALUES	NWYS	SLOPE									
LOW FLOW	11	4	ND									
HIGH FLOW	11	4	ND									



## APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100 ⊁ ∀	00,000	× '	, , , ,	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	IDS PER D	0,000	1	×	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	o, IN POUN	1,000	× × × × × × × × × × × × × × × × × × ×	×××	-
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT - 25 PERCENT	LOAE	- - - -	× 1 ×	× '	- - -
		100	STREAMFLO	100 DW, IN CUBIC FEET PE	1,000 R SECOND

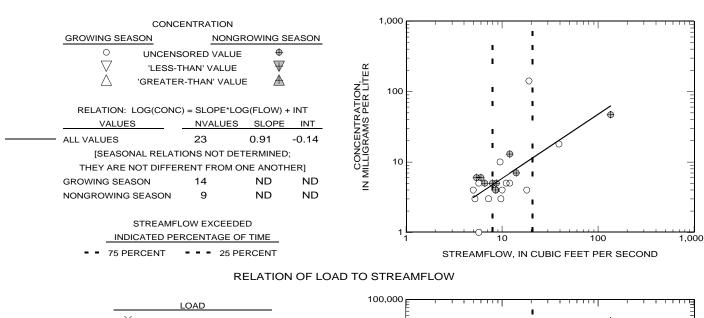
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCE	NTRATION		250		1 1 1	1	Т Т	1	г г	-1	1 1	1	1	1 1	$\neg$
LOW FLOW  UNCENSO  LESS-TI		H FLOW  PER LITER  PER LITER	200	_											_
	ONCENTRATION	TRATIO 18 PER	150	_	0										-
VALUES NVALUES	SES NWYS SLC 6 3	ND OO ND	100	_											_
		<u>Z</u>	50	_	4	<del>)</del>								<b>+</b>	_
			0	76 7	7 78 79	0 80 81	82 8	3 84	85 8	36 87	88	89 9	`	-	<b>⊕</b> ⊃

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	10,000 L L X L L L L L L L L L L L L L L L
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	N N N N N N N N N N N N N N N N N N N
	10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		30		<del></del>	
LOW FLOW HIGH FLOW			<del>•</del>		
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ▲	ATION, PER LITER	40 —			
TRENDS IN CONCENTRATION VALUES NVALUES NWYS SLOPE	Ľω	30 –			
LOW FLOW 9 4 ND HIGH FLOW 2 1 ND	CONCENT IN MILLIGRAMS	20 -	<b>⊕</b>		
			8 0		00

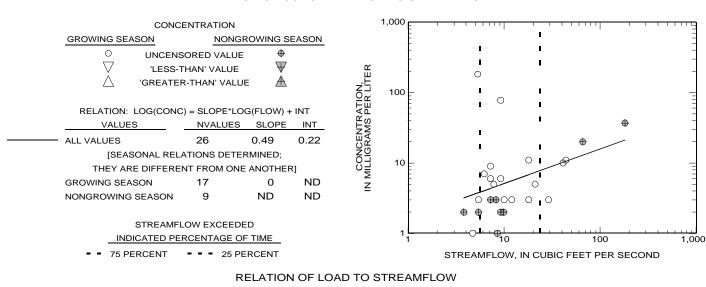
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

50 -

## APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD	100,000
<ul><li>X UNCENSORED VALUE</li><li> √ 'LESS-THAN' VALUE</li></ul>	¥ 10,000 ×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	10,000 × × × × × × × × × × × × × × × × ×
ALL VALUES 26 1.49 0.95	9 5 1,000 ×
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	Z X X
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	Q 100
75 PERCENT 25 PERCENT	10 10 100
	STREAMFLOW, IN CUBIC FEET PER SECOND

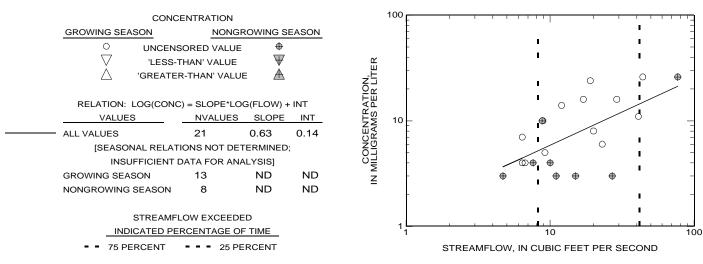
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				250	-	1	-	1	1 1	-	-	-	1		-	-	1	
LOW FLOW			HIGH FLOW	<u>-</u>																
<u>○</u> ∟	INCENSORE	D VALUE	<b>+</b>		œ	200	_													_
,	'LESS-THAN		<b>₩</b>		İTER				0											
	REATER-THA	AN' VALUI	E A	<u> </u>	PER LIT															
TREN	NDS IN CONC	ENTRAT	ION			150	_													-
VALUES	NVALUES	NWYS	SLOPE	E Z	IN MILLIGRAMS															
LOW FLOW	5	3	ND	Ö	GR.	100	_													_
HIGH FLOW	5	3	ND	Ō																
					∑ 7															
					=	50	-		4											-
									⊕ . **											
						0	70 -			2 04		00 6	4.0				00.6	20.0	1 00	<u>_</u>
							76 7	7 78	79 8	) 81	82	83 8	34 8	5 86	87	88	89 9	90 9	1 92	2 93

# APPENDIX 4. Relations of constituent concentration and load to streamflow and trends in concentration with time SUSPENDED SEDIMENT 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD		100,000 E		<del></del>
		Ė	·	· •
× UNCENSORED VALUE		Ė	I	ı =
V 'LESS-THAN' VALUE		-	•	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)	+ INT Y	10,000		· × / ×
VALUES NVALUES SLOPE	INT H	E	<u> </u>	
ALL VALUES 21 1.63	0.88	-	•	$\times$ $\times$
SMOOTHED RELATION BETWEEN LOAD AND FLO	0.88 88.0 W	1,000	× × × × × × × × × × × × × × × × × × ×	×
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	LOAD	100	**\``^	·
75 PERCENT 25 PERCENT		10	10	100
			STREAMFLOW, IN CUBIC FE	ET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			- 1	 		' '				'		
LOW FLOW			HIGH FLOW											
∑ 'GF	INCENSOREI 'LESS-THAN' REATER-THA NDS IN CONC	VALUE AN' VALUE	_	ION, R LITEF	40 <del>-</del> 30 <del>-</del>	<b>+</b>							4	_ _
VALUES	NVALUES	NWYS	SLOPE	ZZ		Ψ								
LOW FLOW	5	4	ND	Ŭ <u>V</u> 2	20 –									_
HIGH FLOW	2	2	ND	OO COO	10 –									
												(	)	
						08	3					С	)	
						 								- 1

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

50

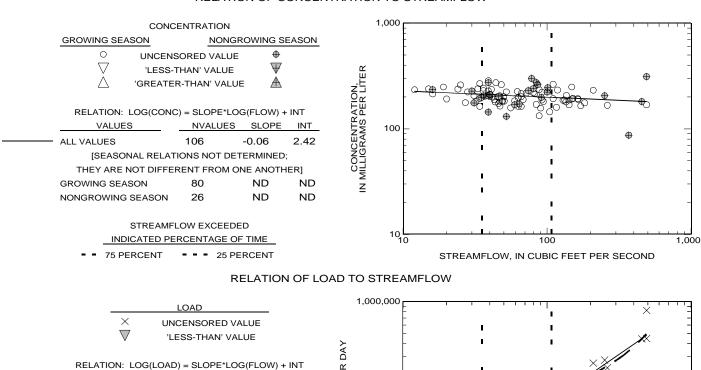
# Appendix 5 Dissolved solids

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

ALL VALUES

NVALUES

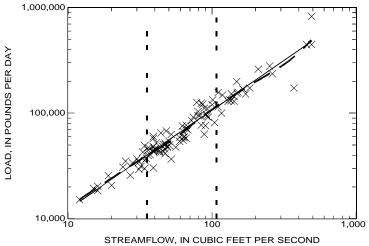
106

SLOPE

STREAMFLOW EXCEEDED

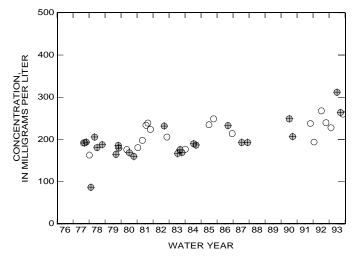
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
o ▽	UNCENSORED VALUE	<b>⊕</b> ₩
	'GREATER-THAN' VALUE	<u> </u>
TR	ENDS IN CONCENTRATI	ON

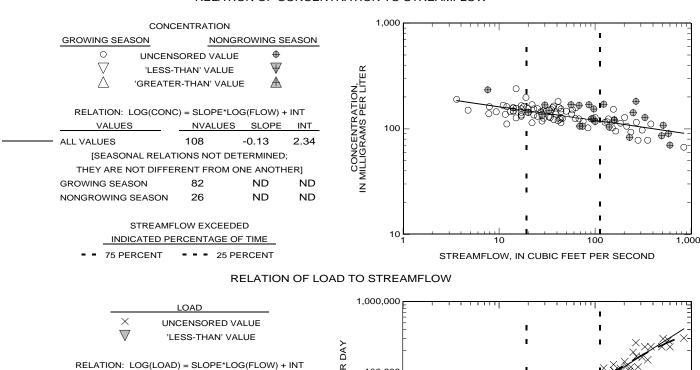
TRENDS IN CONCENTRATION							
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	19	11	ND				
HIGH FLOW	24	11	ND				



### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

ALL VALUES

NVALUES

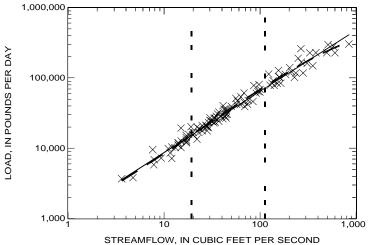
108

SLOPE

STREAMFLOW EXCEEDED

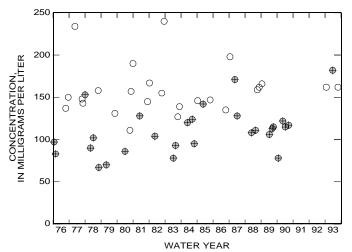
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
Δ,	GREATER-THAN' VALU	E A

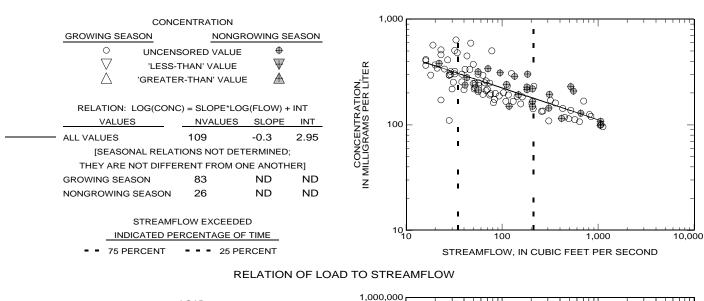
TRENDS IN CONCENTRATION							
VALUES	NVALUES	SLOPE					
LOW FLOW	25	14	ND				
HIGH FLOW	28	15	0				



### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



$oxed{ imes}$ UNCENSORED VALUE $oxed{\mathbb{V}}$ 'LESS-THAN' VALUE	1,000,000	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) +  VALUES  NVALUES SLOPE  ALL VALUES 109 0.7	NT	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	Z E ** X *	= = = = = = = = = = = = = = = = = = = =
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10,000	10,000
	STREAMFLOW, IN CUBIC FEET PER SECON	1D

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION				
LOW FLOW HIGH FLOW				
O UNCENSORED VALUE $\forall$ VIESS-THAN' VALUE $\forall$ Oreater-than' VALUE	ON, LITER	800		_
	ATION, PER LI	600	<u> </u>	_
TRENDS IN CONCENTRATION	α΄ (0			Ч
VALUES NVALUES NWYS SLOPE	ΣŞ		0000	
LOW FLOW 25 14 ND	CONCENT MILLIGRAMS	400	_ 0_0 0 _	_
HIGH FLOW 25 14 0	ĔŖ			
	≣		0 8 00	0
	Z	200	A () A	Φ_

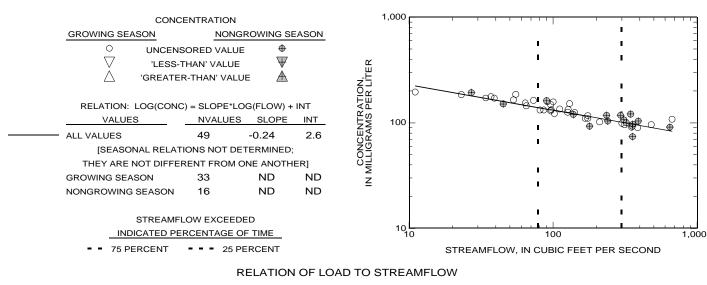
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

1,000

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	>	1,000,000	1 1	, , , , , , , , , , , , , , , , , , ,
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)	+ INT	100,000 —	1 1	
SMOOTHED RELATION BETWEEN LOAD AND FLO (SHOWN IF THERE ARE 10 OR MORE VALUES)	W WOL	-		, i
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	9	10,000		
		10	100 STREAMELOW IN CUBIC F	1,000 FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			200		ı	1 1	1	I		- 1	- 1	'	'	'			'	'	
LOW FLOW			HIGH FLOW																		
$\bigvee_{\Lambda}$	NCENSOREI 'LESS-THAN' REATER-THA	VALUE		ATION, PER LITER	200		0	)				С	8						0	O	00
	IDS IN CONC			TRA IS P	.00		_						0								
VALUES	NVALUES	NWYS	SLOPE	ÄΝ										₽							
LOW FLOW	12	7	ND	CONCENTR IN MILLIGRAMS	100	-ф	Ф.						4	₽							Φ_
HIGH FLOW	14	6	ND	ĖŖ			⊕ <del>0</del>	₽					Ψ							⊕(	∌
				∑		₩															
				Z	50	F															_
					0	ــِــا															لي
						76	77 78	79	80 81	82	83	84	85 8	36	87	88	89	90	91	92	93

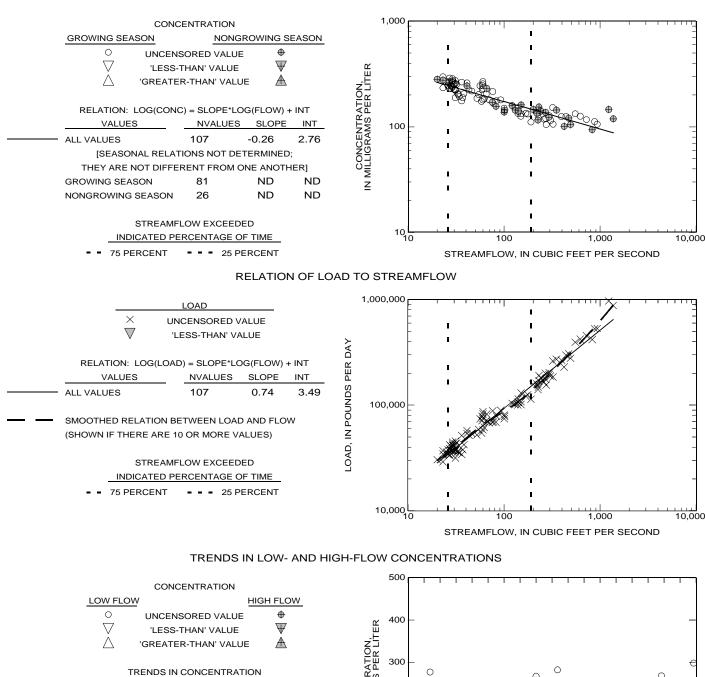
WATER YEAR

250 -

### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



VALUES

LOW FLOW

HIGH FLOW

NVALUES NWYS

30

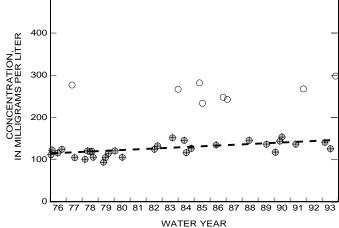
7

14

SI OPF

ND

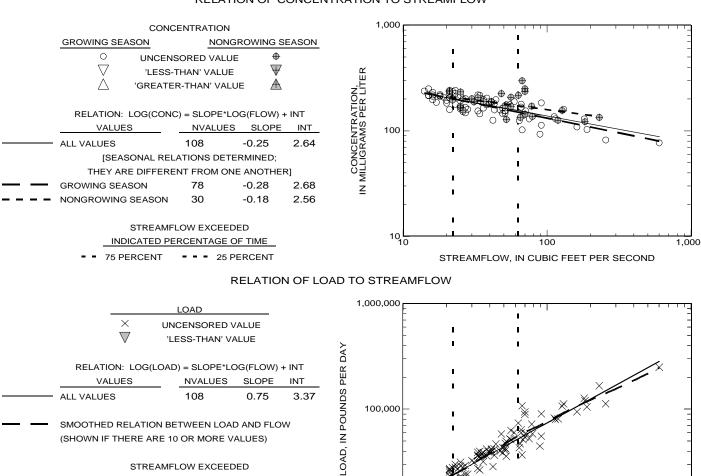
1.78



#### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

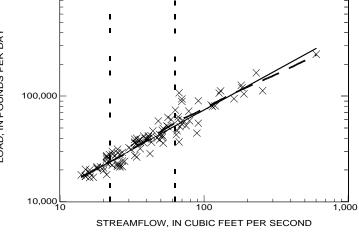
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



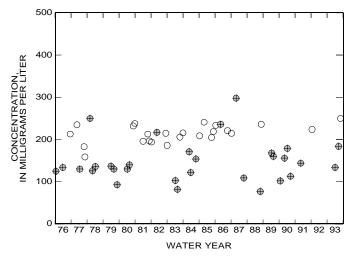
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME

25 PERCENT 75 PERCENT



CONCENTRATION						
LOW FLOW		HIGH FLOW				
0	UNCENSORED VALUE	Φ				
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$				
Δ,	GREATER-THAN' VALU	E A				

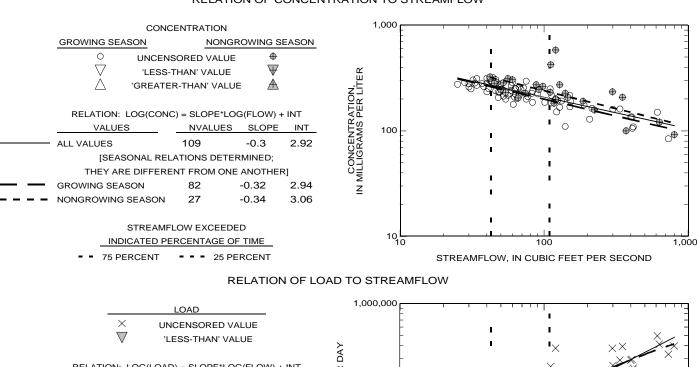
TRENDS IN CONCENTRATION							
VALUES	NVALUES	SLOPE					
LOW FLOW	24	12	ND				
HIGH FLOW	30	15	0				



# APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

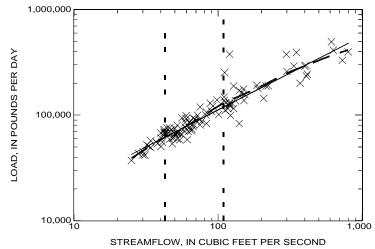


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				
LOW FLOW			HIGH FLOW			
٥ ر	INCENSOREI	O VALUE	<b>⊕</b>			
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$			
△ 'GI	REATER-THA	N' VALUE	<u> </u>			
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			

39

10

15

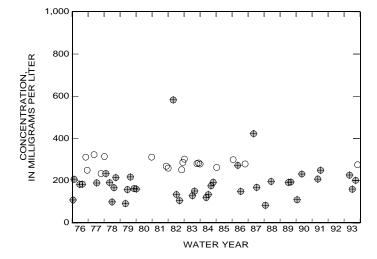
ND

0

LOW FLOW

HIGH FLOW

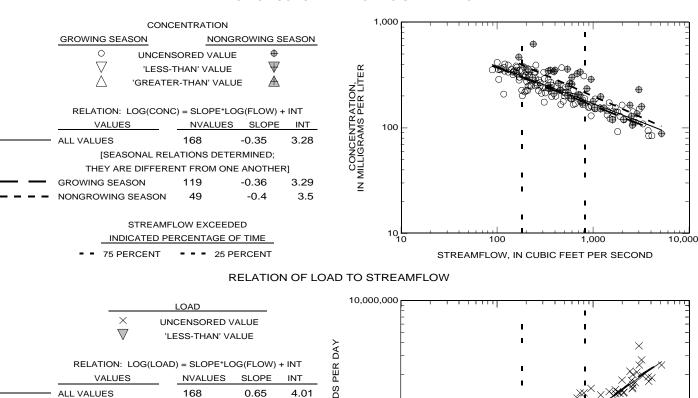
CONCENTRATION



### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

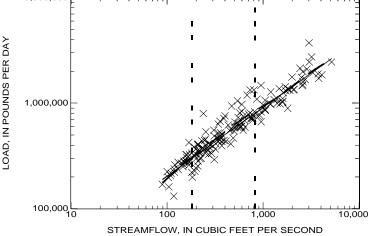


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
0	UNCENSORE	O VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
Δ,	GREATER-THA	N' VALUE	■ 🛦
TRI	ENDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE

14

16

0

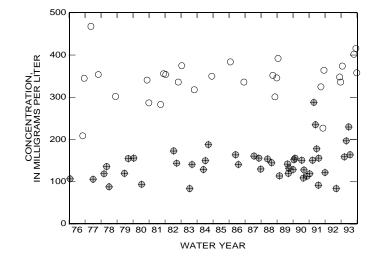
O

29

47

LOW FLOW

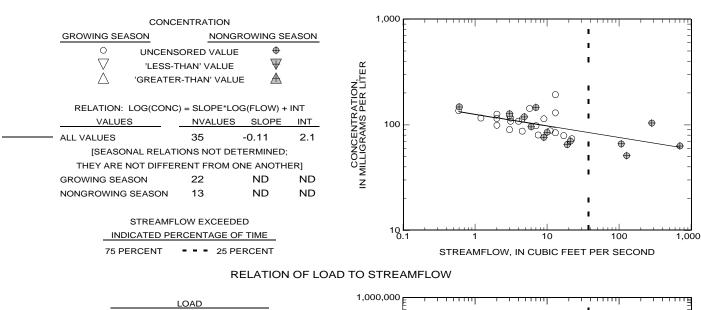
HIGH FLOW



# APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



× UNCENSORED VALUE

□ 'LESS-THAN' VALUE

 $\begin{tabular}{lllll} RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT \\ \hline VALUES & NVALUES & SLOPE & INT \\ \hline ALL VALUES & 35 & 0.89 & 2.83 \\ \hline \end{tabular}$ 

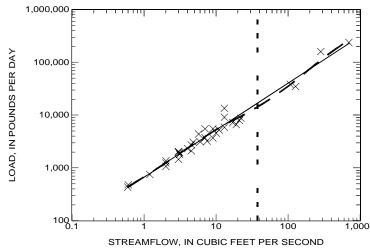
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

250

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
۰ ر	JNCENSOREI	O VALUE	<b>+</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
	REATER-THA	'N' VALUE	■ ▲
TRE	NDS IN CONC	ENTRATI	ON
VALUES	<b>NVALUES</b>	NWYS	SLOPE

4

0

3

ND

ND

LOW FLOW

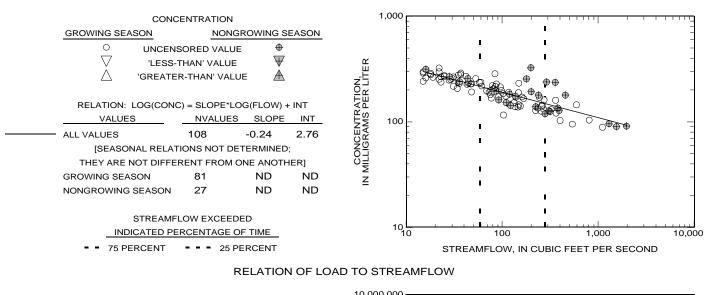
HIGH FLOW

	230		1	1 1	ı	ı	1	1	1	1	1	1	1	1	1	1	
TER	200	_															_
CONCENTRATION, IN MILLIGRAMS PER LITER	150	_															_
CONCEN	100	_															€_
N N	50	<del>•</del>	<b>+</b>														
	0	76 7	7 78	79 8	30 8	1 82						88	89	90	91	92	93
							VVA	ΝE	R YI	EAF	₹						

### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD				10,000,000		<del>, , , , , , , , , , , , , , , , , , , </del>	
$\stackrel{ imes}{ riangledown}$	UNCENSORED \ 'LESS-THAN' V			ΑΥ		1	i	=
RELATION: LOGI VALUES  ALL VALUES	(LOAD) = SLOPE*LO	SLOPE 0.76	+ INT INT 3.5	INDS PER D	1,000,000	! !	1 1 × ***	
SMOOTHED RELATION (SHOWN IF THERE A		ALUES)	w	DAD, IN POU	100,000			-
	ED PERCENTAGE (			) J	10,000		I I U 1,00 1,00	0 10,000
							OW, IN CUBIC FEET PE	•

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

C	ONCENTRATION			500	1 1	ı	1 1	1	1 1	1	1 1	1 1	- 1	1 1	
, LE	CENSORED VALUE ESS-THAN' VALUE ATER-THAN' VALUI	HIGH FLOW	ATION, PER LITER	400	_										_
	S IN CONCENTRAT	ION SLOPE	α	300	- 00	0		000	o o &	0	00 •	0 8	)	0	
LOW FLOW HIGH FLOW	38 16 18 12	0 ND	CONCENT	200	- +		0	(	2	_	0*0	Ü	0		_
			Z	100	⊕ · ·	⊕ ⊕ ⊕ ⊕	<b>⊕</b>		<b>+</b>	Φ	<b>⊕</b>		<b></b>	<b>⊕</b>	_
				0	1 1	- 1	1 1	1	1 1			1 1	1		

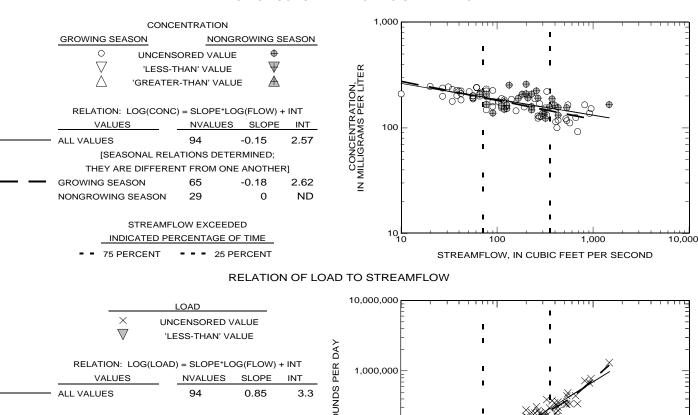
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

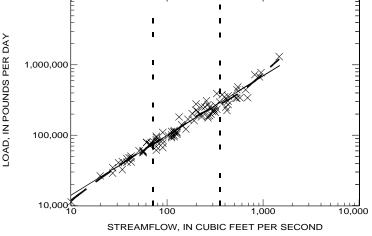


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

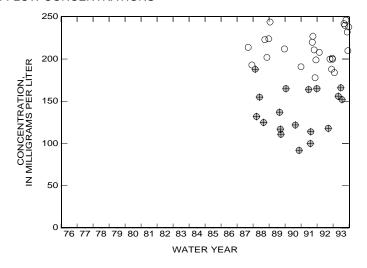
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



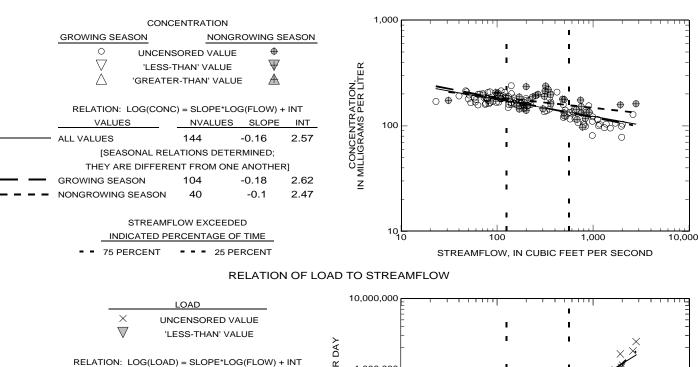
	CONCENTR	ATION				
LOW FLOW HIGH FLOW						
Ο υ	NCENSORE	D VALUE	<b>⊕</b>			
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$			
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$			
TREN	DS IN CONC	ENTRAT	ION			
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	25	7	ND			
HIGH FLOW	18	6	ND			



### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



 VALUES
 NVALUES
 SLOPE
 INT

 ALL VALUES
 144
 0.84
 3

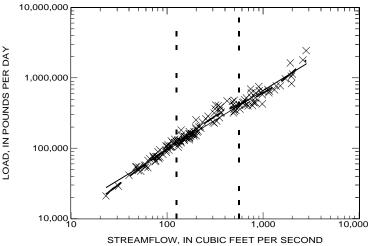
 SMOOTHED RELATION BETWEEN LOAD AND FLOW

(SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

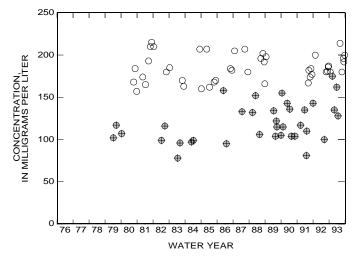
INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
	UNCENSORED VALUE 'LESS-THAN' VALUE	₩
Δ,	GREATER-THAN' VALUE	

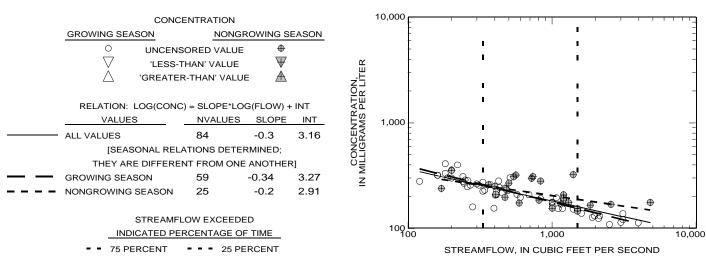
TRENDS IN CONCENTRATION									
VALUES	NVALUES	NWYS	SLOPE						
LOW FLOW	45	13	ND						
HIGH FLOW	36	13	ND						



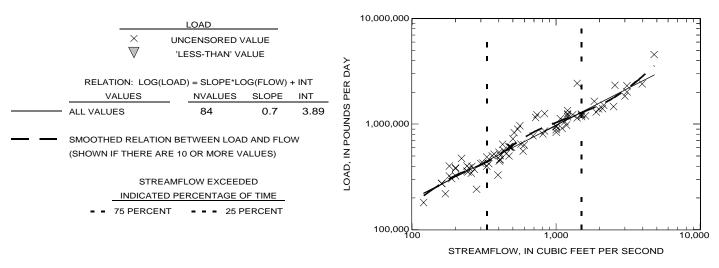
### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRA	TION			300		1	- 1	-	1	- 1	- 1	-1		7	1	1	1
LOW FLOW  U  ,	NCENSORED LESS-THAN' V REATER-THAN	VALUE 'ALUE	HIGH FLOW ⊕ ₩ Æ	ATION, PER LITER	400	_									0		a	, 00,
TREN VALUES	DS IN CONCE	NTRATION	ON SLOPE	<u>α</u> ω	300	=									) ) ()		C	) (
LOW FLOW HIGH FLOW	22 16	6 4	ND ND	CONCENT	200	_									Ŭ 4	<b>~</b> ⊕⊕	· •	)
				Z	100	-									4	Ф <b>#</b>	\$ \$	

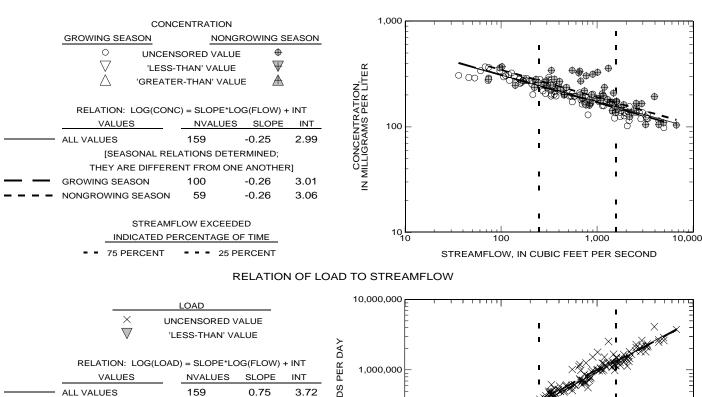
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

500

### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

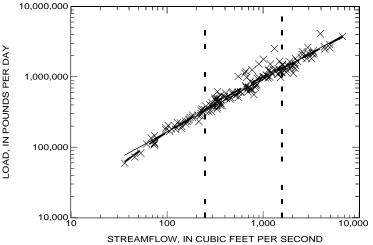


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

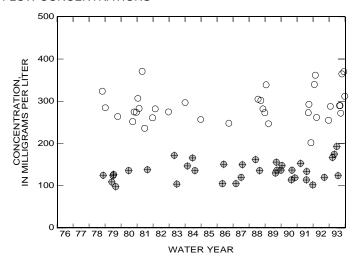
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>+</b>
V.	'LESS-THAN' VALUE	₩.
$\triangle$	'GREATER-THAN' VALU	E A
тр	ENDS IN CONCENTRAT	ION

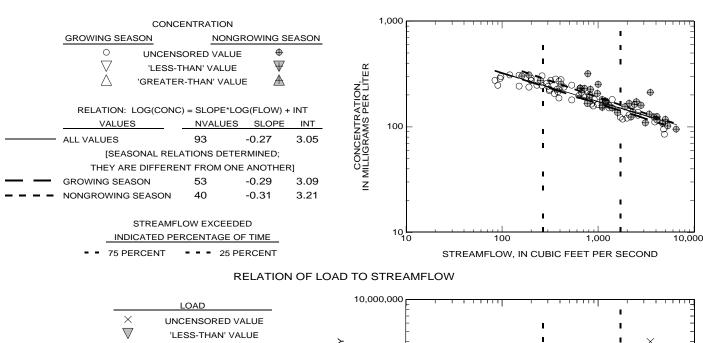
TRENDS IN CONCENTRATION									
VALUES	NVALUES	NWYS	SLOPE						
LOW FLOW	36	13	0						
HIGH FLOW	36	14	0						



### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

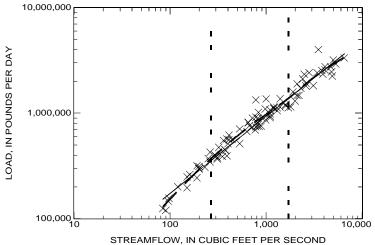
#### RELATION OF CONCENTRATION TO STREAMFLOW



STREAMFLOW EXCEEDED

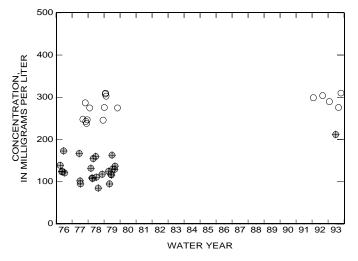
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLO	<u>W</u> <u>F</u>	HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$	'GREATER-THAN' VALUE	$\triangle$
_		

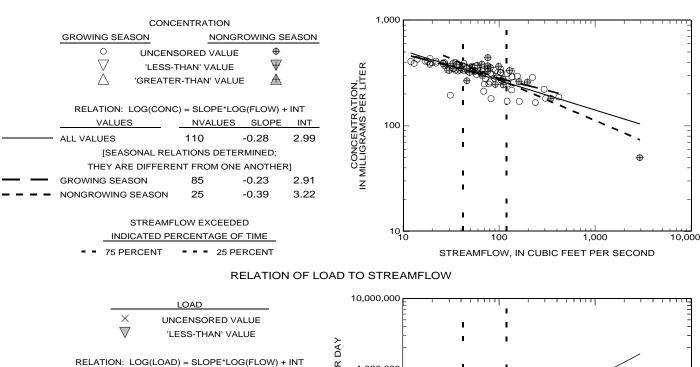
TRENDS IN CONCENTRATION							
VALUES	VALUES NVALUES NWYS SI						
LOW FLOW	17	5	ND				
HIGH FLOW	25	5	ND				



# APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

ALL VALUES

NVALUES

110

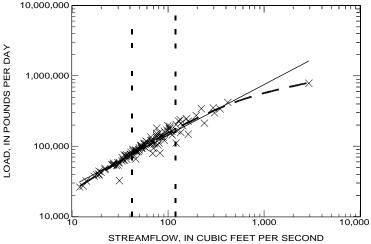
SLOPE

0.72

STREAMFLOW EXCEEDED

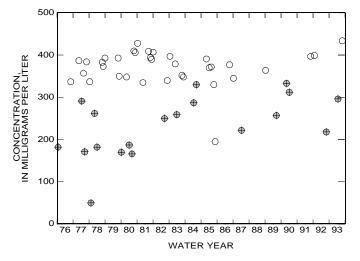
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW	•	HIGH FLOW
0	UNCENSORED VALUE	<b>•</b>
$\vee$	'LESS-THAN' VALUE	$\forall$
$\triangle$	'GREATER-THAN' VALU	E A
тр	ENDS IN CONCENTRAT	ION

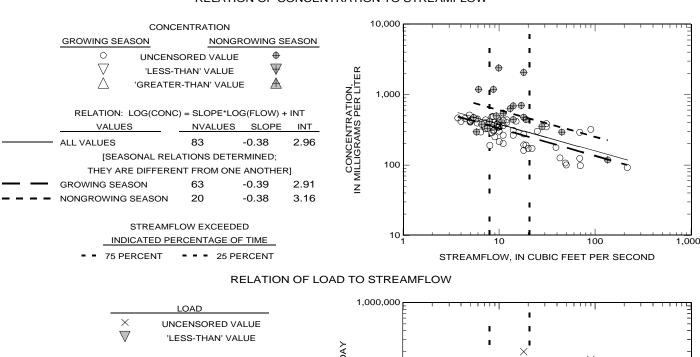
TRENDS IN CONCENTRATION							
VALU	JES	NVALUES	NWYS	SLOPE			
LOW F	LOW	35	15	0			
HIGH F	LOW	19	12	0			



### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



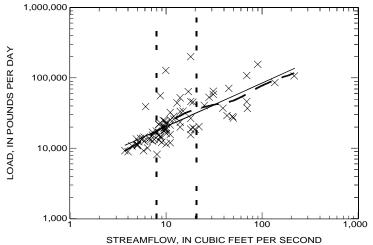
 $\begin{array}{c|cccc} \text{RELATION: LOG(LOAD)} = \text{SLOPE*LOG(FLOW)} + \text{INT} \\ \hline \text{VALUES} & \text{NVALUES} & \text{SLOPE} & \text{INT} \\ \hline \text{ALL VALUES} & 83 & 0.62 & 3.69 \\ \end{array}$ 

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

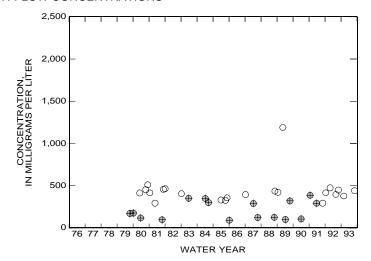
INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTRATION	
LOW FLOV	<u>v</u>	HIGH FLOW
0	UNCENSORED VALUE	<b>+</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$	'GREATER-THAN' VALUE	$\blacksquare$

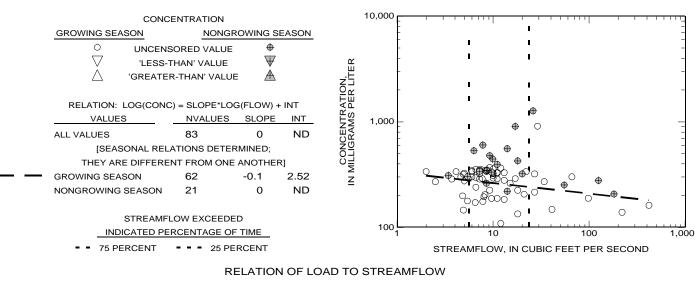
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	22	10	ND			
HIGH FLOW	16	11	ND			



# APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	00,000 - X X X X X X X X X X X X X X X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	10,000 - 10,
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	
	1,000 1 10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
O UNCENSORED VALUE $\forall$ VIESS-THAN' VALUE $\forall$ OGREATER-THAN' VALUE	Z- Z- Z- Z- Z- Z- Z- Z- Z- Z- Z- Z- Z- Z	_
TRENDS IN CONSENTS ATION	VE NO PH 1,500	-
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	Z S	<b>+</b>
LOW FLOW 14 9 ND HIGH FLOW 13 11 ND	CONCENT IN MILLIGRAM	— —
	Z 500	-

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

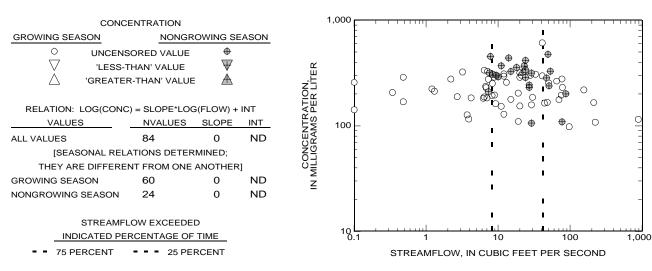
WATER YEAR

2,500

### APPENDIX 5. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SOLIDS 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

$\overset{\times}{\mathbb{V}}$	LOAD UNCENSORED V			>	1,000,000		1 1	1 I I	
 RELATION: LOG( VALUES ALL VALUES	LOAD) = SLOPE*LC  NVALUES  84	OG(FLOW) SLOPE 0.99	+ INT INT 3.12	UNDS PER DA	100,000		-		
SMOOTHED RELATION (SHOWN IF THERE A		ALUES)	W	OAD, IN POU	1,000			1 1 1	
	ED PERCENTAGE C			ב	100	1		I I 100	1,000
						STREAM	FLOW, IN CUBIC	FEET PER SEC	COND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	500				<b>+</b>	
LOW FLOW HIGH FLOW				0	<b>*</b>	
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ★	CONCENTRATION, MILLIGRAMS PER LITER 000	_			Φ.Ο.	0
TRENDS IN CONCENTRATION	S PER SOOF	_	0 ⊕ 0	0 0	<b>⊕</b> 0 0	_
VALUES NVALUES NWYS SLOPE LOW FLOW 26 13 ND	CENT SRAM 500		0 🛖 00 🍙	•	<b>∞</b>	<b>+</b>
HIGH FLOW 19 12 ND	CON		• • •	0 •	• • •	⊕
	≥ <u>Z</u> 100	-	0	0	<b>⊕</b>	<b>+</b> + + -
	0		1 1 1 1 1		1 1 1	
	U.	76 77	78 79 80 81 82 8	3 84 85	86 87 88 8	9 90 91 92 93

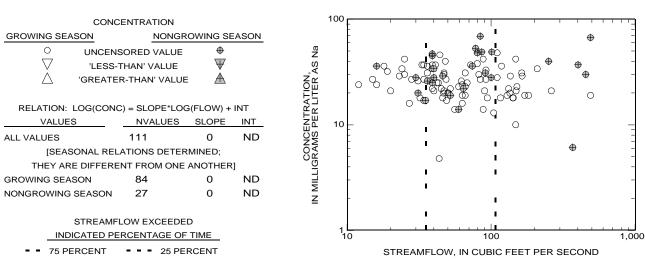
# Appendix 6 Dissolved sodium

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	LOAD			1	,000,000	1 1		''	1 1		<u> </u>
$\stackrel{ imes}{ abla}$	UNCENSORED V			≻	- - - -		1 1	!			-
RELATION: LOG(L VALUES	OAD) = SLOPE*LO NVALUES	OG(FLOW) SLOPE	+ INT INT	PER D	100,000		1	ı		×	
ALL VALUES	111	0.97	2.19	JNDS	- - -				×	X	=
OOTHED RELATIO	N BETWEEN LOAD	AND FLO	w	PO	-		` ×				-
SHOWN IF THERE AR	E 10 OR MORE V	ALUES)		Ď.	10,000	,		XXX	•	×	
STREA	AMFLOW EXCEED	ED		-0A	E	X		× ′•			=
INDICATED	PERCENTAGE C	F TIME		_	-	X	× ^`	ı			-
75 PERCEN	T = = = 25 P	ERCENT				<b>*</b> × ×	ı	I			-
					1,000	1 1	<u> </u>	100	1		1,000
						STREAM	IFLOW, IN C	UBIC FEE	T PER SE	COND	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		100	1 1 1 1	1 1 1		1 1 1	' '
LOW FLOW HIGH FLOW	æ						
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ★	ON, ER AS Na	80					_ _
TRENDS IN CONCENTRATION	CONCENTRATION, IGRAMS PER LITER AS	60					_
VALUES NVALUES NWYS SLOPE							<b>⊕</b>
LOW FLOW 22 11 ND	ΣŽ	40	<b>⊕</b>			<b>⊕</b>	<u></u>
HIGH FLOW 26 11 ND	었쏬			<b>⊕</b>	@ <b>+</b>	<b>⊕</b>	000
	Ĭ		<b>⊕</b>	@ o #	Ψ.	Φ	0 0
	N MILL	20			• ·		_
			<b>⊕</b>			0	-
		0	77 78 79 80 8	81 82 83 84	85 86 87	88 89 90	91 92 93

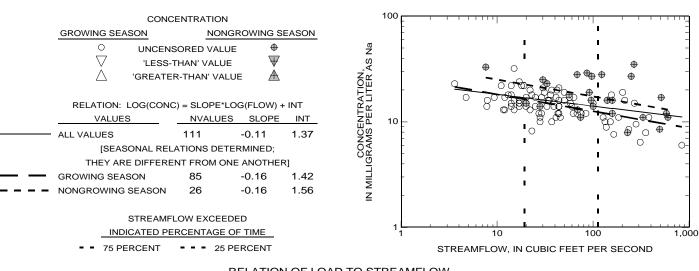
WATER YEAR

100 -

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         111         0.89         2.1	0
<ul> <li>SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)</li> </ul>	NO 2 1,000 X X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	
	100 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		1	
LOW FLOW HIGH FLOW	ď		
○ UNCENSORED VALUE	ž 0 40		
√ 'LESS-THAN' VALUE ₩	, AS		
	ON ER		<b>⊕</b>
	₹⊒ 30	0 0	
TRENDS IN CONCENTRATION	F.E. 20	<b>⊕</b> ⊕	
VALUES NVALUES NWYS SLOPE	CONCENTRATION, GRAMS PER LITER AS Na O 6 6	1	
LOW FLOW 25 14 ND	Ω <u>Ω</u> 20		0
HIGH FLOW 28 15 0	08 <sub>20</sub>		
1101112011 20 10 0	=		0
	∐ ₩ 10 ₩		
	∑ 10		-
	=	Φ Ψ	

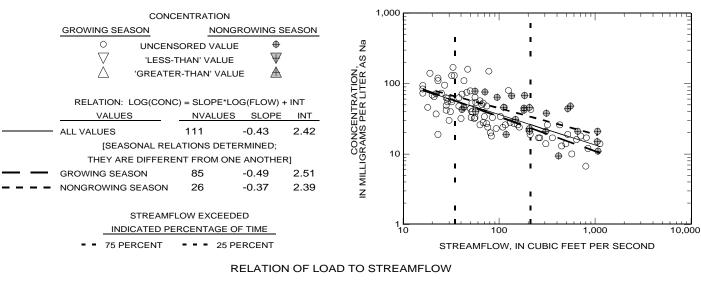
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

50 **-**

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD	1,000,000
✓ UNCENSORED VALUE  ✓ 'LESS-THAN' VALUE  ✓	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	100,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	10,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

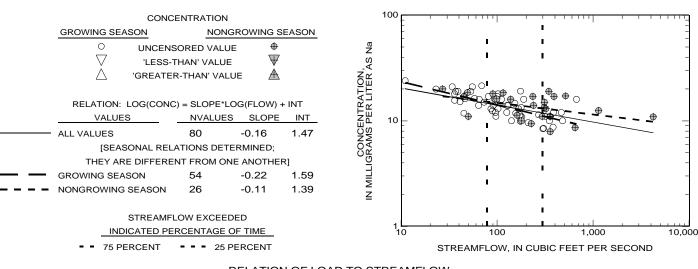
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

_	ONCENTR	ATION			250			- 1	-1	- 1	- 1	-1	- 1	-1	- 1	- 1	- 1	- 1	
,	ONCENTR	ATION																	
LOW FLOW			HIGH FLOW	m															
O UN	CENSOREI	D VALUE	<b>⊕</b>	N N	200	_													
, 'L	ESS-THAN'	VALUE	$\overline{\Psi}$	AS	200														
△ 'GRE	ATER-THA	N' VALU	E A	ATION, LITER A				0											
				£5	150														
TREND	S IN CONC	ENTRAT	ION	ዾዹ	100						_					_			
VALUES	NVALUES	NWYS	SLOPE	E.E.							O	0			(	0			
LOW FLOW	26	14	ND	CONCE	100					0									
HIGH FLOW	26	14	0	SA A	100		0			0									
				- 6			O			_			O	0				$\circ$	
				₩ W	50					0			0	0			0	0	
				2	50		$\oplus$				0			#	<del>)</del>	$\circ$			

0

78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR [NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD		1,000,000	<del>-                                    </del>	<del></del>	<u></u>
× UNCENSORED VALUE		Ė	ı		=
V 'LESS-THAN' VALUE	×	-	ı	I	×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW	) + INT	100,000	Ī	•	//
VALUES NVALUES SLOPE	INT G	100,000	-	i . X	
ALL VALUES 80 0.84	2.2	}	-	· ·××	=
— SMOOTHED RELATION BETWEEN LOAD AND FL	ow J		1 1	××××××××××××××××××××××××××××××××××××××	-
(SHOWN IF THERE ARE 10 OR MORE VALUES)	<u>z</u>	10,000		* * * ` ·	
STREAMFLOW EXCEEDED	o O	<u> </u>		•	=
INDICATED PERCENTAGE OF TIME		' F		ı	=
75 PERCENT 25 PERCENT			, i	ı	-
		1,000	100	1,000	10,000
			STREAMFLOW,	IN CUBIC FEET PER	R SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		1 ' ' ' ' ' ' ' '			' ' d
LOW FLOW HIGH FLOW	æ				
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ♥  △ 'GREATER-THAN' VALUE ▲	ENTRATION. PER LITER AS Na 51	- O	○ <b>○ ○ ○ ○ ○ ○ ○ ○</b>	0	00 0
TRENDS IN CONCENTRATION	TRA TRA TRA TRA TRA	.0	<del>•</del>		
VALUES NVALUES NWYS SLOPE	EN C	• •	_	$\oplus$	Φ,
LOW FLOW 21 11 ND	0¥ 10		<b>⊕</b>		Φ
HIGH FLOW 21 10 ND	CONCE IN MILLIGRAMS 2	⊕ ⊕ ⊕			_

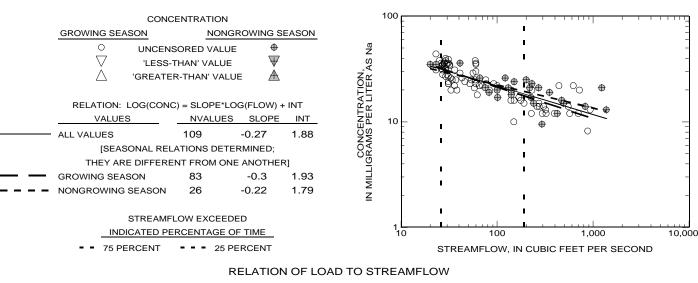
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



$\overline{\mathbb{V}}$	LOAD UNCENSORED VALUE 'LESS-THAN' VALUE	>	1,000,000	<u> </u>	1 1	
RELATION: LOG( VALUES  ALL VALUES	(LOAD) = SLOPE*LOG(FLOW) +  NVALUES SLOPE  109 0.73	NT	100,000	1 1	1 × × × × × × × × × × × × × × × × × × ×	- - - - - - - - - - - - - - - - - - -
(SHOWN IF THERE A	ON BETWEEN LOAD AND FLOW RE 10 OR MORE VALUES) EAMFLOW EXCEEDED	LOAD, IN PO	10,000		1	
- 75 PERCE	ED PERCENTAGE OF TIME  NT 25 PERCENT		1,000	100	I I 1,000 N CUBIC FEET PER :	10,000

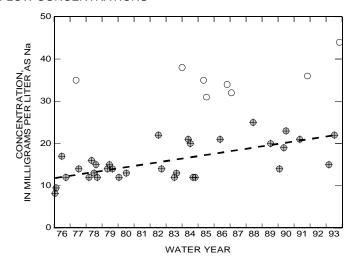
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

HIGH FLOW

○ UNCENSORED VALUE #							
abla 'Less-than' value $ abla$							
△ 'GF	△ 'GREATER-THAN' VALUE 🛧						
TRENDS IN CONCENTRATION							
VALUES NVALUES NWYS SLOP							
LOW FLOW	8	7	ND				
 HIGH FLOW	32	14	0.58				

LOW FLOW

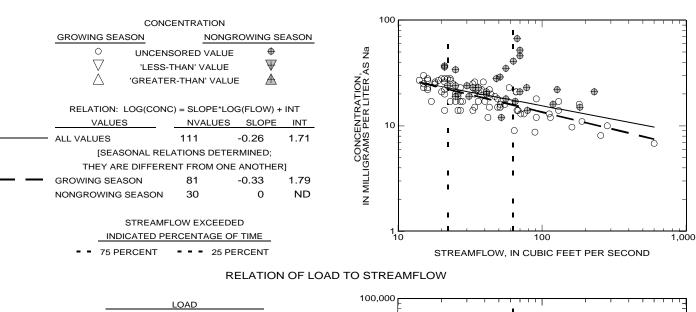
CONCENTRATION



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	X X X X X X X X X X X X X X X X X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z Q	10,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	1,000 10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW	•	
○ UNCENSORED VALUE ♥  ∨ 'LESS-THAN' VALUE ▼	LITER AS Na	_
	은판	<b>⊕</b>
	∑ 50	· <del> -</del>
TRENDS IN CONCENTRATION	F.A.	<b>⊕</b>
VALUES NVALUES NWYS SLOPE	E S	<b>•</b>
LOW FLOW 24 12 ND	CONCENT GRAMS PEI	<b>→</b>
HIGH FLOW 32 16 0	28	0
	⊒ ∑ 20	
	Z	
		¥

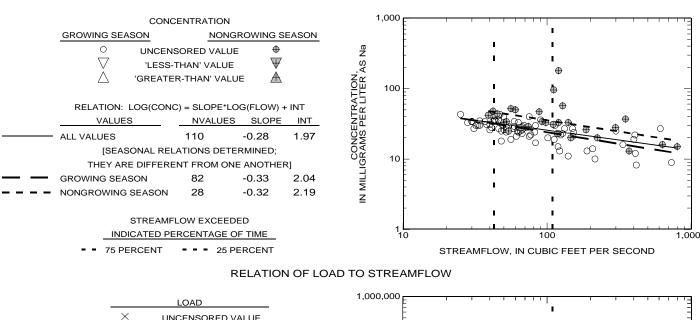
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

100

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



× UNCENSORED VALUE

VLESS-THAN' VALUE

 RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

 VALUES
 NVALUES
 SLOPE
 INT

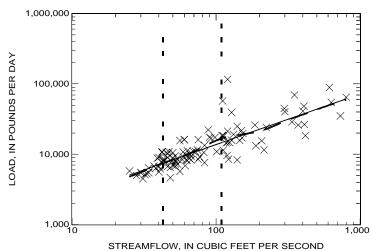
 ALL VALUES
 110
 0.72
 2.7

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

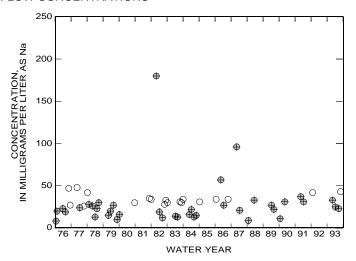
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



CONCENTRATION							
LOW FLOW	1	HIGH FLOW					
0	UNCENSORED VALUE	<b>+</b>					
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$					
$\triangle$	'GREATER-THAN' VALU	E A					
TO	DENIDO IN CONCENTRAT	TON					

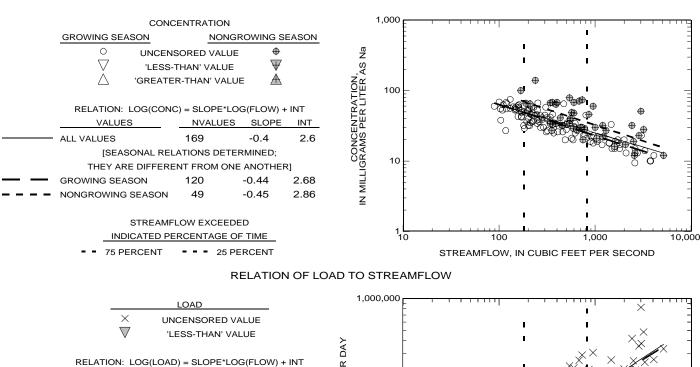
TRENDS IN CONCENTRATION							
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	19	11	ND				
HIGH FLOW	39	15	0				



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

ALL VALUES

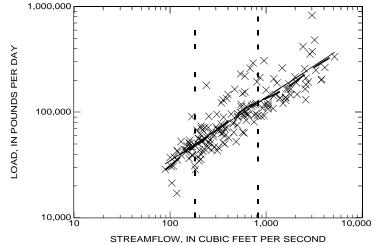
NVALUES

SLOPE

STREAMFLOW EXCEEDED

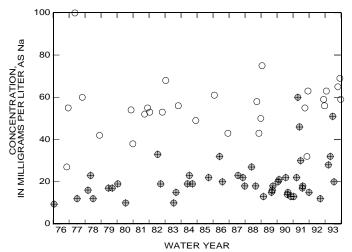
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



CONCENTRATION							
LOW FLOV	<u>v</u>	HIGH FLOW					
0	UNCENSORED VALUE	<b>⊕</b>					
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$					
$\triangle$	'GREATER-THAN' VALUE	■ 🛦					

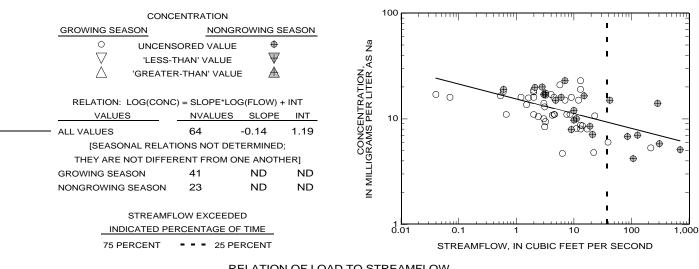
TRENDS IN CONCENTRATION							
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	29	14	0				
HIGH FLOV	/ 47	17	0				



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

×	LOAD UNCENSORED VALUE 'LESS-THAN' VALUE		<u>&gt;</u>	100,000					× ×-
RELATION: LO VALUES - ALL VALUES	$ \frac{\text{OG(LOAD)} = \text{SLOPE*LOG(FLOV}}{\text{NVALUES}} \frac{\text{SLOPE}}{64} \\ 0.86 $	•	NDS PER DA	1,000				) X	(
	ATION BETWEEN LOAD AND FI E ARE 10 OR MORE VALUES)	LOW	D, IN POU	100			×	1	
	TREAMFLOW EXCEEDED  ATED PERCENTAGE OF TIME  CENT 25 PERCENT	_	LOA	10	0.1	1	10	100	1,000
					STREAM	IFLOW, IN C	UBIC FEET P	ER SECOND	)

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

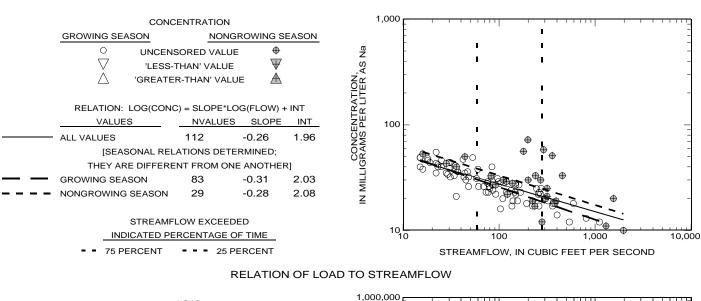
CONCENTRATION		1 ' '		
LOW FLOW	HIGH FLOW			
O UNCENSORED VALUE	JE $\oplus$ Z $_{0}$ 20	20 —		_
LESS-THAN' VALU	S			
△ 'GREATER-THAN' VAI	TOE W ON THE TOTAL THE TOT			
	<u>∑</u> 1:	5 - +	<b>+</b>	_
TRENDS IN CONCENTR	ATION KA			0
VALUES NVALUES NWY	S SLOPE U			
LOW FLOW 0 0	CONCI CONCI MILLIGRAMS	0 –		_
HIGH FLOW 9 5	ND QĶ			
	Ä	•	⊕	
	Ĭ ,	5	→ → → → → → → → → → → → → → → → → → →	=
	Z	₩		

0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	0
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	Q 10,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	1,000 10 100 1,000 10,000 STREAMELOW IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		100		1 1	'	1 1	1 1	- 1	1 1	1 1	'	1	
LOW FLOW HIGH FLOW	m												
○ UNCENSORED VALUE	N Sa	80	_										
abla 'Less-than' value $ abla$	, AS												
	N HO												
	RATION, R LITER	60	_						Φ.				
TRENDS IN CONCENTRATION	E H					0			<b>⊕</b>	0			
VALUES NVALUES NWYS SLOPE	S PE					Õ	_	$\infty$		8	_		$\cap$
LOW FLOW 39 16 0	AMS	40	- 0	. 0	0	a Er	0		00		O		_
HIGH FLOW 19 12 ND	28		0.5	3 -	0	,	0 6		00	,	<b>⊕</b>	+	
	Ξ					)	- 0		0 0		-	<b>+</b>	
	Ĭ	20	_⊕0	_ €	_	,	<b>⊕</b>	<b>⊕</b>	<b>⊕</b>		<b>⊕</b>	Ψ	
	Z		0		•		•	Ψ	Ψ		Ψ	<b>⊕</b>	
				₩	-		Ψ					Ψ	

100 -

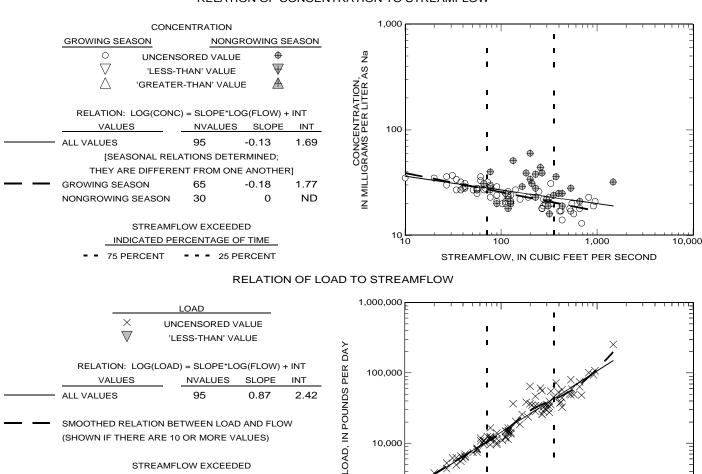
0

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

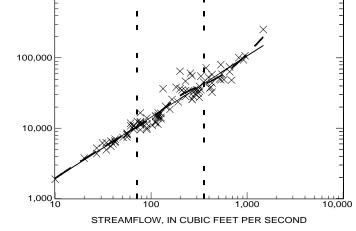
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

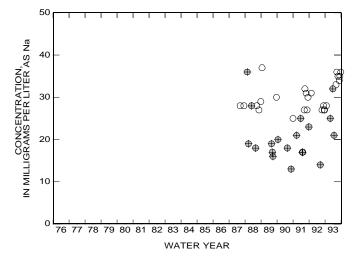


(SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



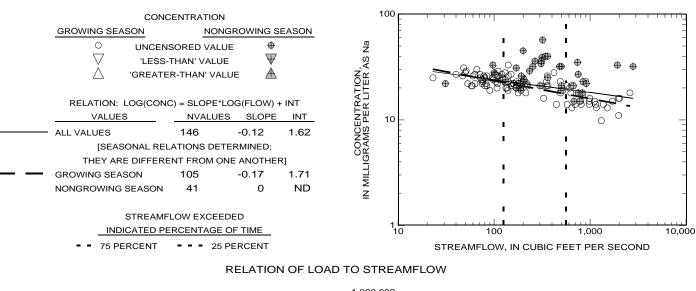
CONCENTRATION										
LOW FLOW			HIGH FLOW							
Ο υ	NCENSORE	D VALUE	<b>⊕</b>							
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$							
△ 'GREATER-THAN' VALUE 🛣										
∴ 'GREATER-THAN' VALUE   TRENDS IN CONCENTRATION										
TREN	IDS IN CONC	ENTRATI	ON							
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	25	7	ND							
HIGH FLOW	19	6	ND							



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD		1,000,000	<del></del>	· · · · · · · · · · · · · · · · · · ·	
$\stackrel{ imes}{ abla}$	UNCENSORED VALUE 'LESS-THAN' VALUE		_	1	i	××
VALUES	LOAD) = SLOPE*LOG(FLOW)  NVALUES SLOPE	INT 0		1		
	146 0.88  ON BETWEEN LOAD AND FLO RE 10 OR MORE VALUES)	2	10,000			-
	EAMFLOW EXCEEDED  ED PERCENTAGE OF TIME  NT 25 PERCENT	0	10,000			
			1,000	100	1,000 N CUBIC FEET PER	· ·

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW	σ.	
○ UNCENSORED VALUE    ✓ 'LESS-THAN' VALUE    ✓ 'GREATER-THAN' VALUE    Æ	CONCENTRATION, SRAMS PER LITER AS Na 0 0 0 0	• • • • •
TRENDS IN CONCENTRATION VALUES NVALUES NWYS SLOPE	ENTR	
LOW FLOW 45 13 ND HIGH FLOW 36 13 ND	CONC IN MILLIGRAMS	

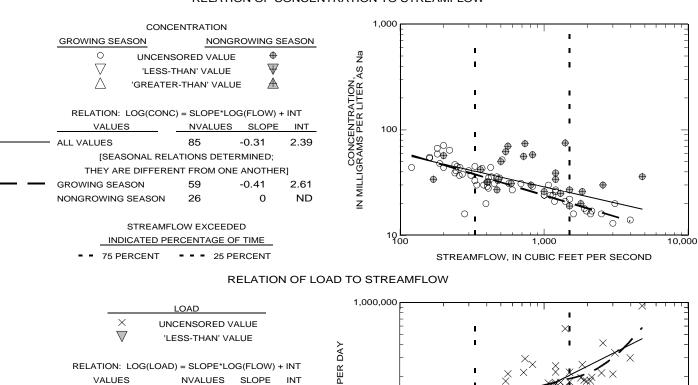
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

50 **-**

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

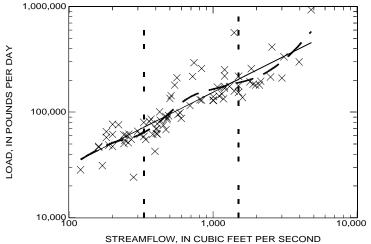


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

VALUES

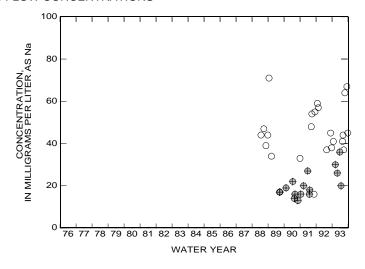
ALL VALUES

STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



	CONCENTRATION	
LOW FLOW	1	HIGH FLOW
0 \	UNCENSORED VALUE	<b>+</b>
\ \ \	'LESS-THAN' VALUE	- ₩
$\triangle$	'GREATER-THAN' VALU	E /II

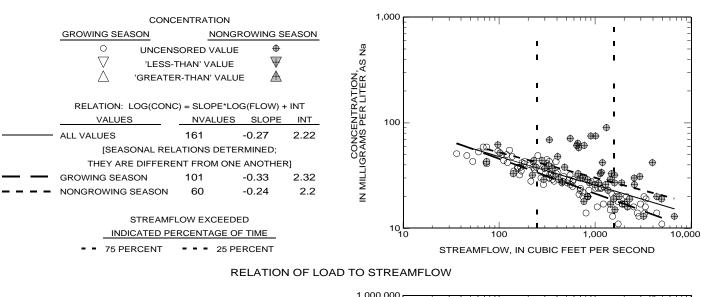
11	TRENDS IN CONCENTRATION									
VALUES	NVALUES	NWYS	SLOPE							
LOW FLO	w 22	6	ND							
HIGH FLO	w 16	4	ND							



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

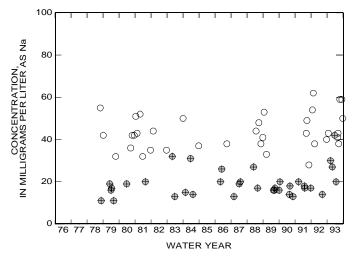
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000		×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	100,000		
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	10,000 - 10,		
75 PERCENT 25 PERCENT	1,000	I I I I I I I I I I I I I I I I I I I	0,000

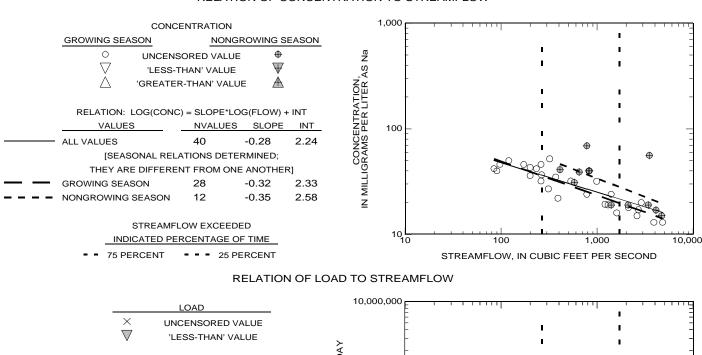
	CONCENTR	ATION					
LOW FLOW		HIGH FLOW					
Ο υ	NCENSORE	D VALUE	<b>+</b>				
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$				
△ 'GF	≣ ▲						
TREN	IDS IN CONC	ENTRAT	ION				
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	36	13	0				
HIGH FLOW	36	14	0				



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



×	LOAD UNCENSORED V. 'LESS-THAN' VA				10,000,000			1 1	
RELATION: LOG(  VALUES  ALL VALUES	(LOAD) = SLOPE*LO NVALUES 40	G(FLOW) SLOPE 0.72	+ INT INT 2.98	IDS PER DAY	1,000,000		1	I × I	- - - - - - - - - - - - - - - - - - -
SMOOTHED RELATION (SHOWN IF THERE A		ALUES)	w	OAD, IN POUN	100,000		1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 ×		* -
75 PERCE	ED PERCENTAGE O NT 25 PI	F TIME ERCENT		_	10,000	100	1,00	I I 0	10,000
						STREAMELOW	IN CUBIC FEET PE	R SECOND	,

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

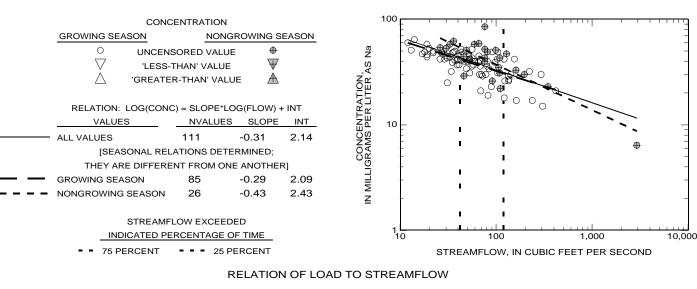
					100														
	CONCENTR	ATION			100	- 1	1	1	ı	ı	1	1	ı	-	ı	1	ı	ı	ı
LOW FLOW			HIGH FLOW	ď															
Ο υ	NCENSORE	VALUE	<b>⊕</b>	Z a	80	_													
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$	, A	00														
△ 'GF	REATER-THA	N' VALUE	■ ▲	ER O															
				FRATION,	60	_													
TREN	IDS IN CONC	ENTRAT	ION	FR															
VALUES	NVALUES	NWYS	SLOPE	CONCENT IGRAMS PEF								0							
LOW FLOW	11	8	ND	N N N N N N N N N N N N N N N N N N N	40	_	0					_				0			
HIGH FLOW	11	7	ND	38.6				00										0	
				7				0											
				M	20	- ,	<b>э</b> ф	•					<b>⊕</b>				$\oplus$		4
				Z			⊕ ♥	•	<del>)</del>				Ψ						€

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD				1,000,000	1 1 1 1	<del></del>		1 1 1	11119
×	UNCENSORED V	ALUE			F					=
$\nabla$	'LESS-THAN' VA	LUE		>_	F	i	i			-
RELATION: LOG(	LOAD) = SLOPE*LC	G(FLOW)	+ INT	R DA		Ī	<u>-</u>			-
VALUES	NVALUES	SLOPE	INT	PER	100,000	,			. —	=
ALL VALUES	111	0.69	2.87	NDS	Ē	•	· · · · · · · · · · · · · · · · · · ·			=
SMOOTHED RELATIO	ON BETWEEN LOAD	AND FLC	)W	٥Oul	-	1		××		1
(SHOWN IF THERE A	RE 10 OR MORE VA	ALUES)		Ž	10,000		XXXX			=
STRE	EAMFLOW EXCEED	ED		OAD	E F.×		`*^` 1			1
INDICATE	D PERCENTAGE O	FTIME		_	[* <del>*</del>	^	Ī			7
- 75 PERCE	NT = = 25 P	ERCENT			-					-
					1,000		100	1,000		10,000
						STREAM	MELOW IN C	UBIC FEET PER	SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION

100

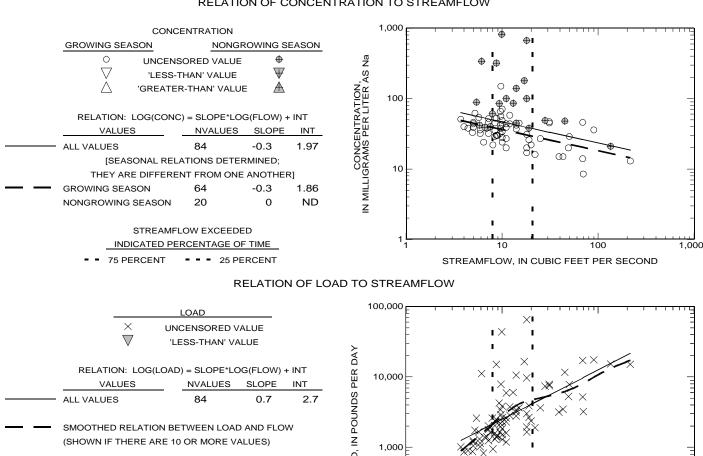
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

LOW FLOW			HIGH FLOW	a		
O U	NCENSORE	VALUE	<b>⊕</b>	S Na	80	
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$	, Š		
△ 'GF	REATER-THA	N' VALUE	■ ▲	ER		
				RATION, R LITER AS	60	
TREN	DS IN CONC	ENTRATI	ON	XX.	00	
VALUES	NVALUES	NWYS	SLOPE	S PE		
LOW FLOW	35	15	0	CONCI	40	
 HIGH FLOW	19	12	1.23	28		
				M	20	
				_ Z	•	<b>←</b>

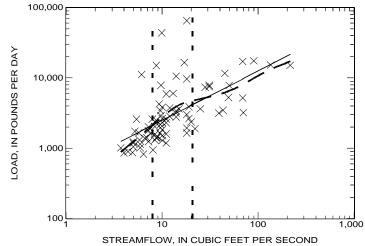
## APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

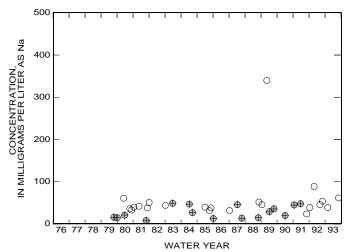


STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$	'GREATER-THAN' VALU	E A
TD	ENDO IN CONCENTRAT	TON!

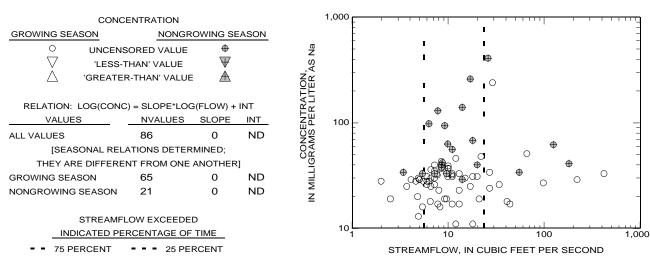
TREINDS IN CONCENTRATION								
VALUES	NVALUES	NWYS	SLOPE					
LOW FLOW	22	10	ND					
HIGH FLOW	16	11	ND					



# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	0 100,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	OV 1,000
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	100 1 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	300	
LOW FLOW HIGH FLO	<u>w</u>	
O UNCENSORED VALUE #	e V V V V V V V V V V V V V V V V V V V	_ <del>-</del>
'LESS-THAN' VALUE	.∢ Zγ	
△ 'GREATER-THAN' VALUE ⚠		
TRENDS IN CONCENTRATION	CONCENTRATION GRAMS PER LITER 000000000000000000000000000000000000	-
VALUES NVALUES NWYS SLOPE	E'H	
-	AS (S	<b>+</b>
LOW FLOW 14 9 ND	0 ₹ 200 ·	
HIGH FLOW 14 11 ND	ე <u>ც</u>	
	TI 100-	
		-
	Z	⊕ ⊕
	01	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

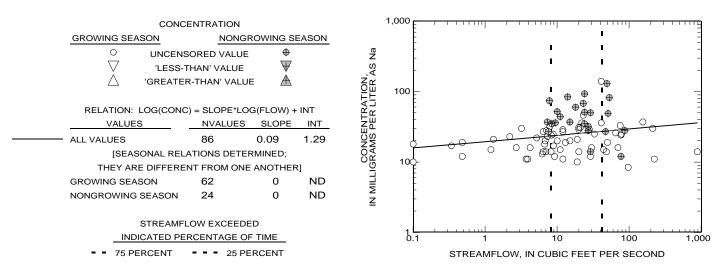
WATER YEAR

500 -

# APPENDIX 6. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED SODIUM 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

_		LOAD				1,000,000	<del> </del>	<del>-                                    </del>	<del> <u>-</u> </del>	· · · · · · · · · · · · · · · · · · ·
		CENSORED \				100 000		ı	1	
	V 'LE	SS-THAN' V	ALUE		DAY	100,000		I	I ××	<b>1</b>
RELATIC	N: LOG(LOAD	) = SLOPE*LO	OG(FLOW)	+ INT	IR D	10,000		ı		$\times$
VAL	UES	NVALUES	SLOPE	INT	H.	. 3,333				
ALL VALUES	6	86	1.09	2.02	DS	F			× î	=
					Ž	1,000			<b>*</b>	=
- SMOOTHED	RELATION BE	TWEEN LOAI	D AND FLO	W	ВО	E			ı	=
(SHOWN IF	THERE ARE 10	OR MORE V	ALUES)		Z	100		<b>/</b> ^	1	
	STREAMFL	OW EXCEED	DED		OAD	Ē		I	Ī	=
!	INDICATED PE	RCENTAGE (	OF TIME		_	10		•		=
<b></b> 75	5 PERCENT	25 F	PERCENT			*		Ī	· ·	3
						0.1	1	10	100	1,000
							STREAMI	FLOW, IN CUBIC	FEET PER SE	COND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		250	
LOW FLOW         HIGH FLOW           ○         UNCENSORED VALUE         ⊕           ▽         'LESS-THAN' VALUE         ₩           △         'GREATER-THAN' VALUE         ★	CONCENTRATION, MILLIGRAMS PER LITER AS Na	200 -	_
TREMPO IN COMPENTE ATION	RAT	150	-
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	PEI		<b>+</b>
LOW FLOW 27 13 ND	ONC AM8	100 -	_
HIGH FLOW 19 12 ND	25.5		Φ
	1	50	-
	<u>Z</u>	0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

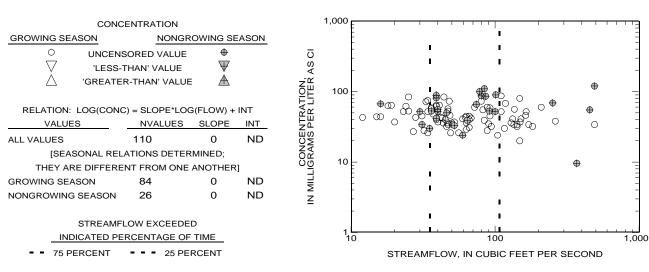
# Appendix 7 Dissolved chloride

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD		1,0	000,000	<del>-                                    </del>	<del></del>		
	DRED VALUE HAN' VALUE	<b>&gt;</b>		1	1 1	×	
RELATION: LOG(LOAD) = SLO VALUES NVAI	OPE*LOG(FLOW) + INT	PER D	100,000	1		×	=
ALL VALUES 110	0.95 2.4	la SONO	<u>-</u>	·			=
— SMOOTHED RELATION BETWEEN	N LOAD AND FLOW	<u>P</u>	-			×	-
(SHOWN IF THERE ARE 10 OR M	ORE VALUES)	N. D.	10,000		× × × · · · · · · · · · · · · · · · · ·		
STREAMFLOW E.  INDICATED PERCENT		γο/	E ×	××××			=
75 PERCENT	25 PERCENT		- 1	1	1		-
			1,000 10		100		1,000
				STREAMFLOW, IN	N CUBIC FEET PE	R SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		250	
LOW FLOW	HIGH FLOW		
O UNCENSORED VALUE			
	₩ ₹ **		
TRENDS IN CONCENTRATION	NO R.P.	150	-
	DIA DE PROPER DIA DEPAR DIA DE PROPER DIA DE PROPER DIA DEPAR DIA		<b>+</b>
LOW FLOW 22 11	ND ZŽ	100	
HIGH FLOW 25 11	ND SR		• •
	∑ Z	50	
	_	'	<b>*</b> • • • • • • • • • • • • • • • • • • •
		0	<u> </u>
		ŭ	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

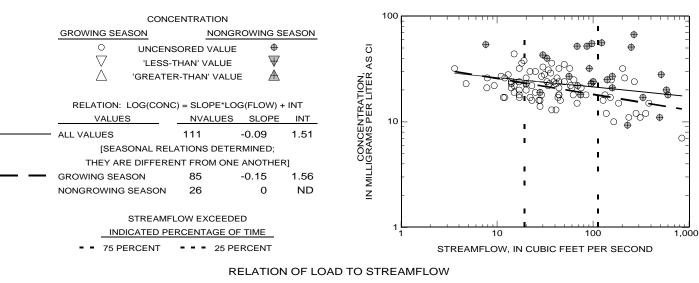
WATER YEAR

250 -

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



$\dfrac{\text{LOAD}}{ imes}$ UNCENSORED VALUE "LESS-THAN" VALUE	>	100,000		I k	× × ×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT		10,000	×		
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	LOAD, IN	1,000	**************************************	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
		1	10 STREAMFLOW, II	100 N CUBIC FEET PER	1,000 R SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		.00		1
LOW FLOW	GH FLOW			
○ UNCENSORED VALUE  VESS-THAN' VALUE  VERATER-THAN' VALUE	ER AS C	80	D — — — — — — — — — — — — — — — — — — —	-
TRENDS IN CONCENTRATION	TTRATION,	60	1	_
	SLOPE HIS		0	
LOW FLOW 25 14	ND ŠŠ	40	o -	+
HIGH FLOW 28 15	0 08			
	O O ONGENITA	0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93	3

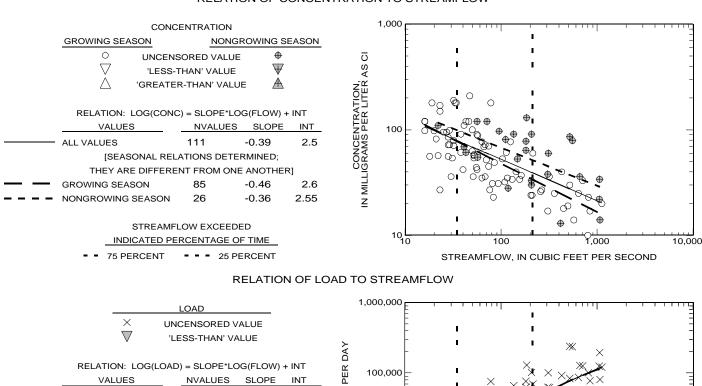
WATER YEAR

100 -

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



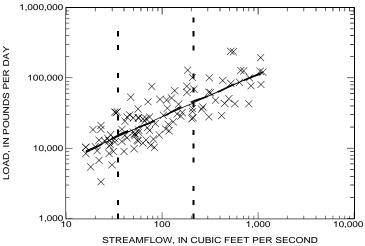
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

ALL VALUES

STREAMFLOW EXCEEDED

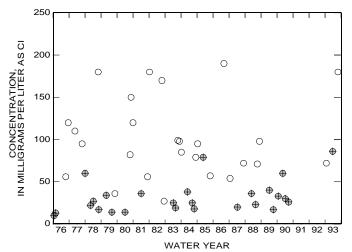
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



CONCENTRATION								
LOW FLOW		HIGH FLOW						
	UNCENSORED VALUE 'LESS-THAN' VALUE	₩						
Δ,	GREATER-THAN' VALUE							

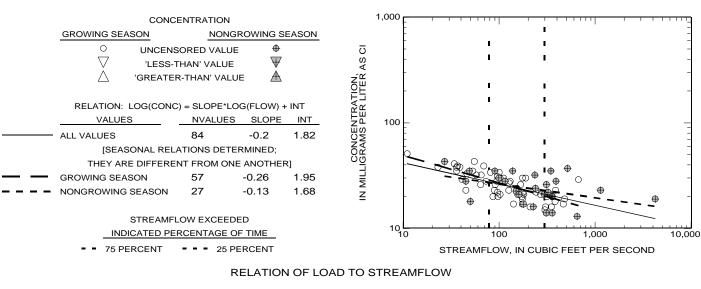
TRENDS IN CONCENTRATION								
VALUES	NVALUES	NWYS	SLOPE					
LOW FLOW	26	14	ND					
HIGH FLOW	26	14	0					



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE		1,000,000		1 1	×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW           VALUES         NVALUES         SLOPE           ALL VALUES         84         0.8	INT	100,000 M 100,000	1		
SMOOTHED RELATION BETWEEN LOAD AND FI     (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	LOW	10,000 to 0		, ,	
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	_ r	1,000	100	1 1 1,000	10,000
			STREAMELOW	IN CUBIC FEET PER	SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION				'		'	'			'				' '	
LOW FLOW HIGH FLOW	_														
$\bigcirc$ UNCENSORED VALUE $\stackrel{\oplus}{ extstyle iggle}$ 'LESS-THAN' VALUE $\stackrel{\triangle}{ extstyle iggle}$ 'GREATER-THAN' VALUE $\stackrel{\triangle}{ extstyle iggle}$	ON, TER AS CI	0 –													-
TRENDS IN CONCENTRATION	RATI ER LI	0 –													_
VALUES NVALUES NWYS SLOPE	F.S.														С
LOW FLOW 21 11 ND	CONCE GRAMS 4	0 –						6			0		Ç	þ	0
HIGH FLOW 22 10 ND	00 80		O	0	0			6	ୃ	0					_
	⊒		00	0_		) 1			4	<del>-</del>				Ф	<b>⊕</b>
		0		₽	ф Ф	, O (b)			<b>⊕</b>			<b></b>		Φ,	<b>∌</b> –
	_	₩,	<b>•</b>		Ψ										

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

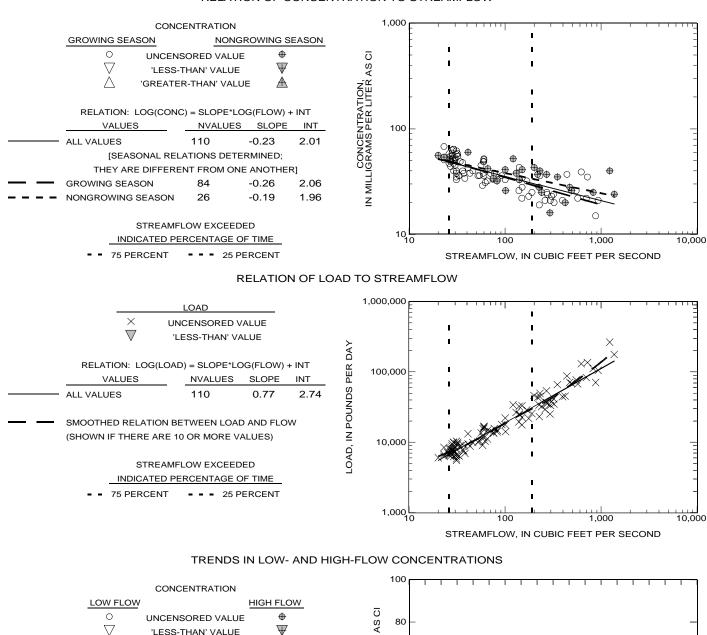
WATER YEAR

100 -

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



Δ

VALUES

LOW FLOW

HIGH FLOW

'GREATER-THAN' VALUE

TRENDS IN CONCENTRATION

8

32

NVALUES NWYS

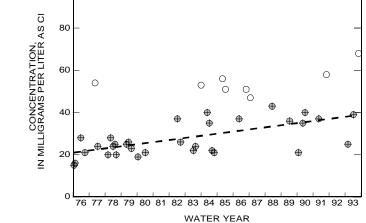
7

14

 $\mathbb{A}$ 

ND

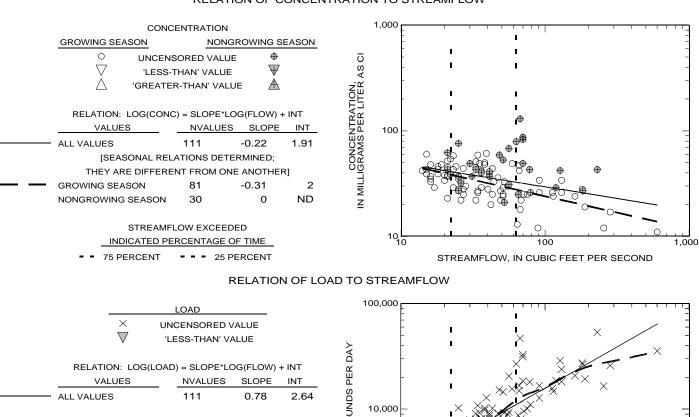
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# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

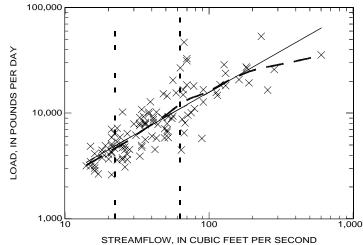


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

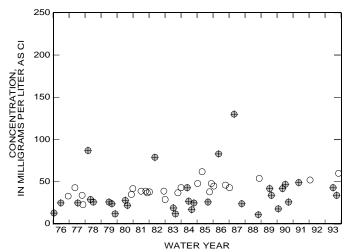
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW	<u> </u>	HIGH FLOW
○	UNCENSORED VALUE 'LESS-THAN' VALUE GREATER-THAN' VALUE	⊕ ₩ Æ
TRI	ENDS IN CONCENTRATION	ON

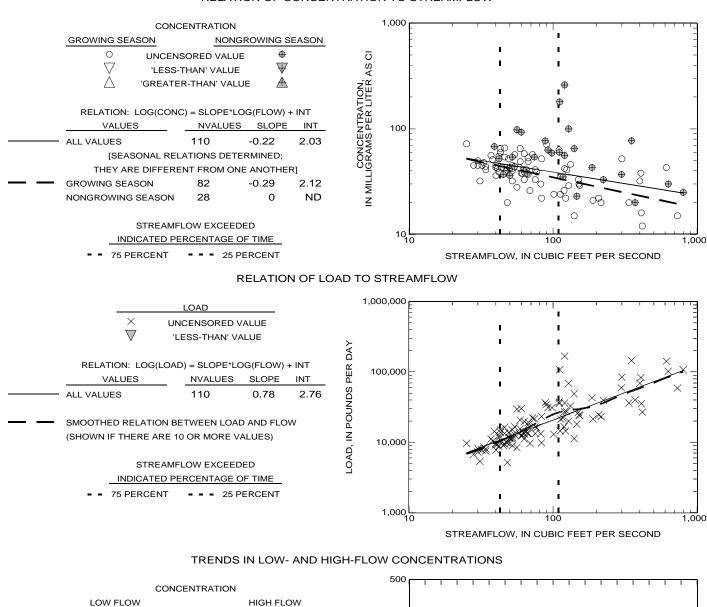
TRENDS IN CONCENTRATION									
VALUES	NVALUES	NWYS	SLOPE						
LOW FLOW	24	12	ND						
HIGH FLOW	32	16	0						



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

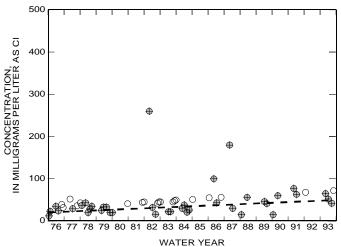
#### RELATION OF CONCENTRATION TO STREAMFLOW



Ň	LESS-THAN <sup>7</sup> REATER-THA		
TREN VALUES	IDS IN CONC	ENTRATI	ION SLOPE
LOW FLOW	19	11	ND
 HIGH FLOW	39	15	1.64

**UNCENSORED VALUE** 

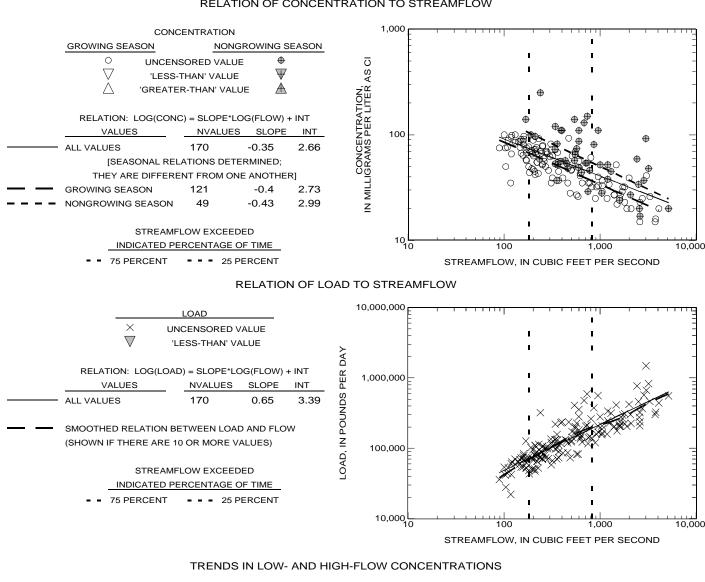
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# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

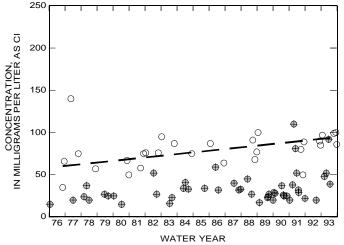
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



_	LOW FLOW			HIGH FLOW
	O и	NCENSORE	D VALUE	<b>⊕</b>
	$\triangle$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
	△ 'GF	REATER-THA	N' VALUE	<b>A</b>
	TREN	DS IN CONC	ENTRATI	ON
	VALUES	NVALUES	NWYS	SLOPE
	LOW FLOW	29	14	2
	HIGH FLOW	48	17	0

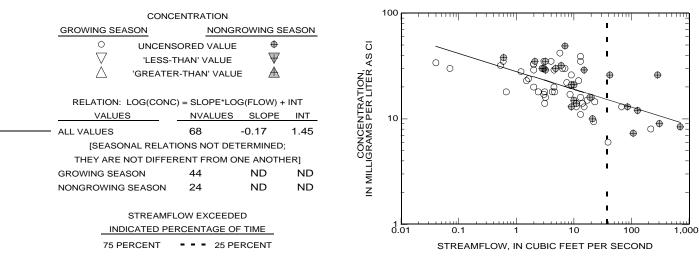
CONCENTRATION



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         68         0.83         2.19	ND N	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	0 100 F	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	0.01 0.1 1 10 100 1.0	
	STREAMELOW IN CUBIC FEET PER SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			1
LOW FLOW	HIGH FLOW		
○ UNCENSORED VALUE  VESS-THAN' VALUE  GREATER-THAN' VALUE	⊕ 00 40 ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩	0 –	_
TRENDS IN CONCENTRAT VALUES NVALUES NWYS	ON O		_ ⊕
LOW FLOW 0 0 HIGH FLOW 10 5	ND 20 ND ND ND 10	⊕ ●	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

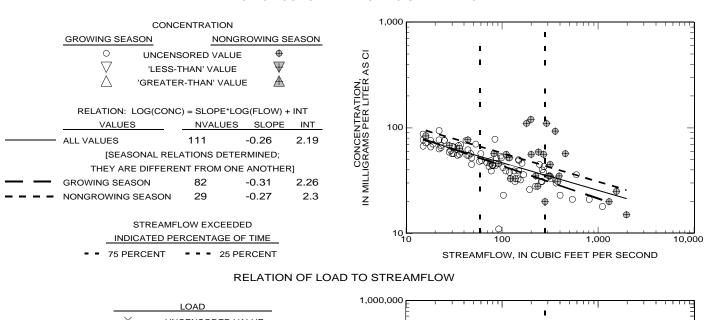
WATER YEAR

50 **-**

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD				1,000,000		11111	•	1 1	
$\stackrel{ imes}{ abla}$	UNCENSORED V			Α	-		1 1	I I	*	- - -
RELATION: LOG	(LOAD) = SLOPE*LO	OG(FLOW)	+ INT	R D	100,000		ī	$\times$ $\times$ $\times$	×	
VALUES	NVALUES	SLOPE	INT	PE	100,000				`	3
ALL VALUES	111	0.74	2.92	NDS	E F		- - × <b>* *</b>			=
- SMOOTHED RELATI	ON BETWEEN LOAI	O AND FLC	)W	POU	-	*		<b>X</b> `X		-
(SHOWN IF THERE A	ARE 10 OR MORE V	ALUES)		Ξ	10,000		X	Ī		=
STR	EAMFLOW EXCEED	ED		OAE	E		' ×	I		=
INDICAT	ED PERCENTAGE C	OF TIME		_				1		_
75 PERCE	NT 25 P	ERCENT			-		1	ı		-
					1,000		100	1,00	00	10,00
						STREA	MFLOW, II	N CUBIC FEET PE	ER SECOND	)

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTR	ATION		250		1 1	ı	1 1	ı	1 1	1 1	ı		
LOW FLOW	HIGH F												
O UNCENSORE	) VALUE	——————————————————————————————————————	200	L									
C 'LESS-THAN'	VALUE 5	₩ <	200										
△ 'GREATER-THA	N' VALUE	LTER,											
		Ě5	150										
TRENDS IN CONC	ENTRATION	F.R.											
VALUES NVALUES	NWYS SLOP	DO OID OOD OO OID OID								_			
LOW FLOW 39	16	0 0	100	_						<b>⊕</b>		_	
HIGH FLOW 19	12 N	ID OS				_	0				(	)	
		Ë			o 0	8	000	0	$\infty$	0 0	3 6	3 0	
		IN WILL	50	F &	O	(		06	Ø 0	00,		-	Φ _
		Z		⊕ ⊕	э ф (	<b>⊕</b> `	, 0	$\oplus$	$\oplus$	<b>4</b>		<b>⊕</b>	-

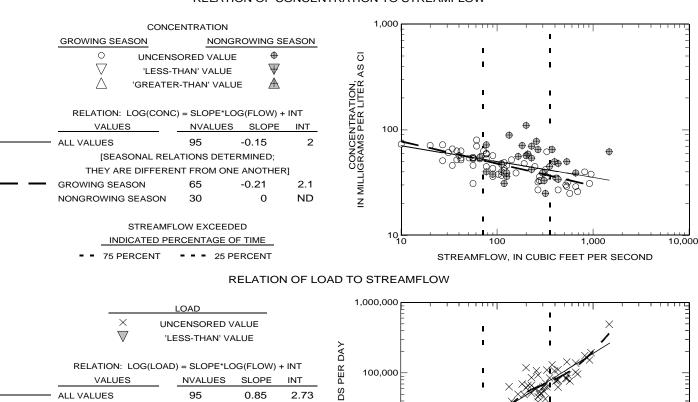
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76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

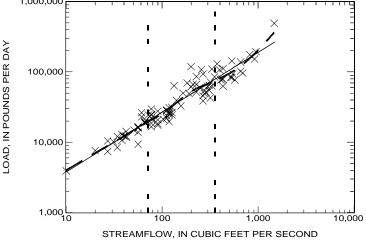


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

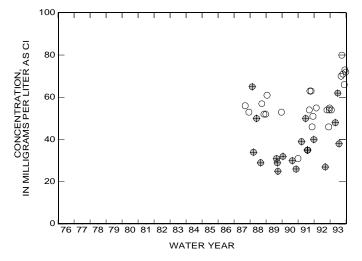
CONCENTRATION				
LOW FLOW			HIGH FLOW	
O U	NCENSORE	D VALUE	<b>⊕</b>	
	'LESS-THAN'	VALUE	$\overline{\Psi}$	
△ 'GI	REATER-THA	N' VALUE	■ ▲	
TREN	IDS IN CONC	ENTRATI	ON	
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	25	7	ND	

6

ND

19

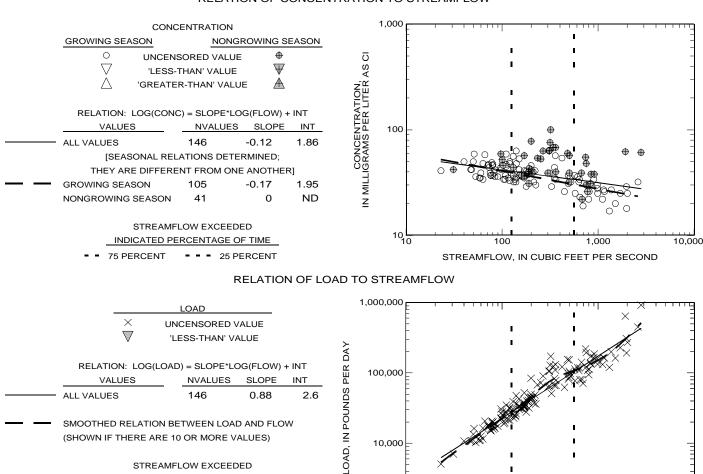
HIGH FLOW



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

10,000

1,000 L

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
0	UNCENSORE	O VALUE	<b>+</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
△ , ′	GREATER-THA	N' VALUE	■ ▲
TRE	NDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE

13

13

ND

ND

45

36

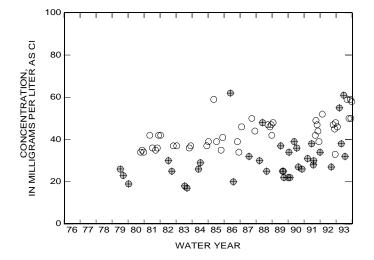
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME

75 PERCENT

LOW FLOW

HIGH FLOW

25 PERCENT



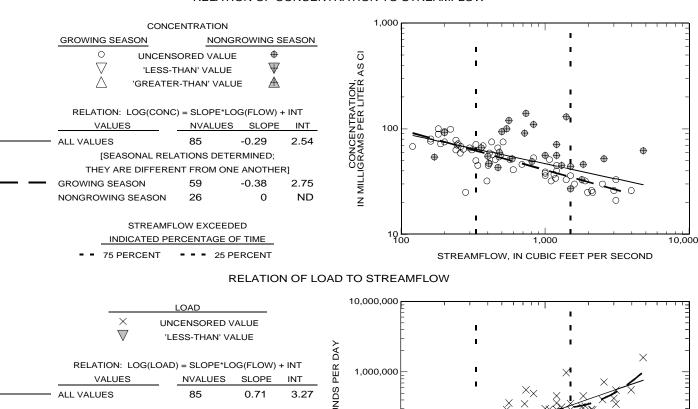
STREAMFLOW, IN CUBIC FEET PER SECOND

10,000

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

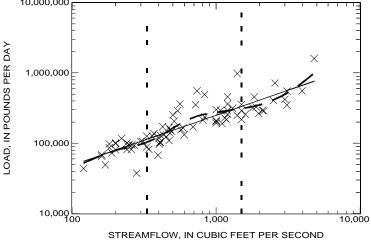


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

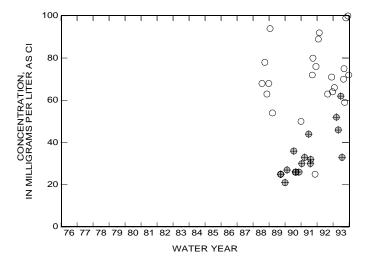
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT

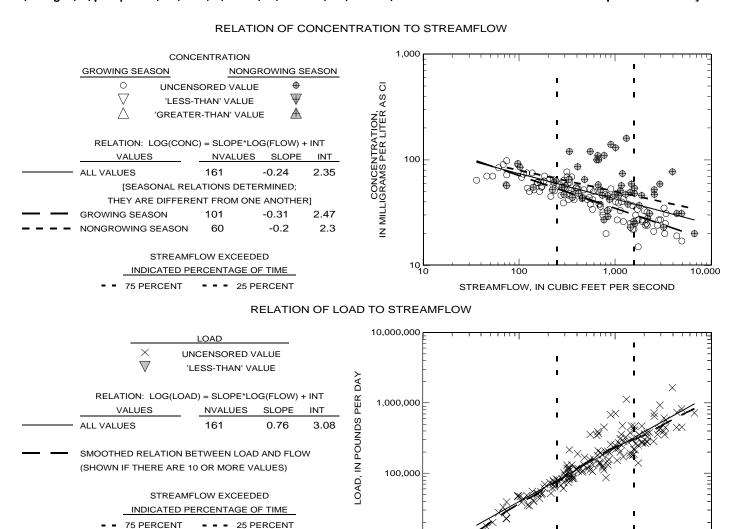


CONCENTRATION				
LOW FLOW			HIGH FLOW	
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$	
△ 'GF	REATER-THA	N' VALUE	<b>A</b>	
TRENDS IN CONCENTRATION				
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	22	6	ND	
HIGH FLOW	17	4	ND	



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

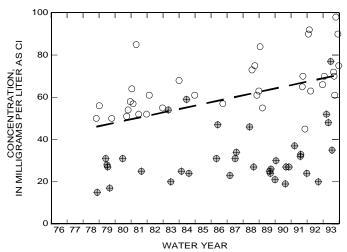
LUCLIELOW

10,000 L

_	LOW FLOW			HIGH FLOW
	Ο υ	NCENSORE	D VALUE	<b>+</b>
	$\triangle$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
	△ 'GF	REATER-THA	N' VALUE	■ 🛦
	TREN	DS IN CONC	ENTRAT	ION
	VALUES	NVALUES	NWYS	SLOPE
	LOW FLOW	36	13	1.62
	HIGH FLOW	36	14	0

LOW/FLOW

CONCENTRATION



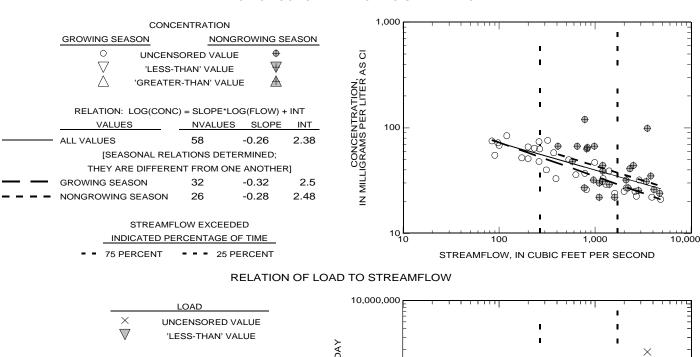
STREAMFLOW, IN CUBIC FEET PER SECOND

10,000

# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

ALL VALUES

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

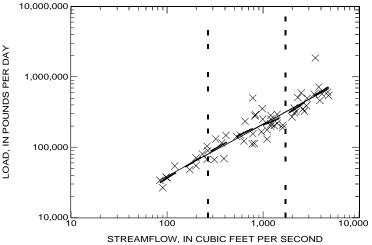
NVALUES

SLOPE

STREAMFLOW EXCEEDED

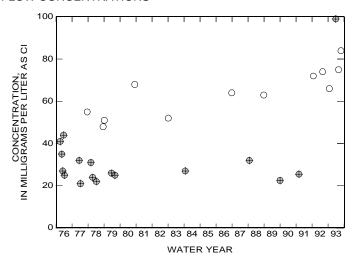
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOV	v <u>ні</u>	GH FLOW
0	UNCENSORED VALUE	Φ
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$	'GREATER-THAN' VALUE	$\triangle$
т.	DENIDS IN CONCENTRATION	NI.

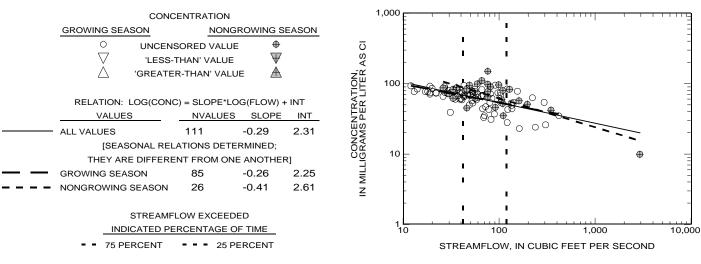
TRENDS IN CONCENTRATION			
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	12	9	ND
HIGH FLOW	17	9	ND



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD	1,000,000
× uncensored value  ▼ 'LESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  111  0.71  3.04	100,000 - 1 1 × 1× × ×
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	10,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	1,000 1,000 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

HIGH FLOW

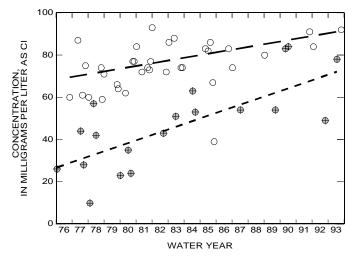
^	LESS-THAN' REATER-THA		₩ ★
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
 LOW FLOW	35	15	1.29
 HIGH FLOW	19	12	2.59

LOW FLOW

0

CONCENTRATION

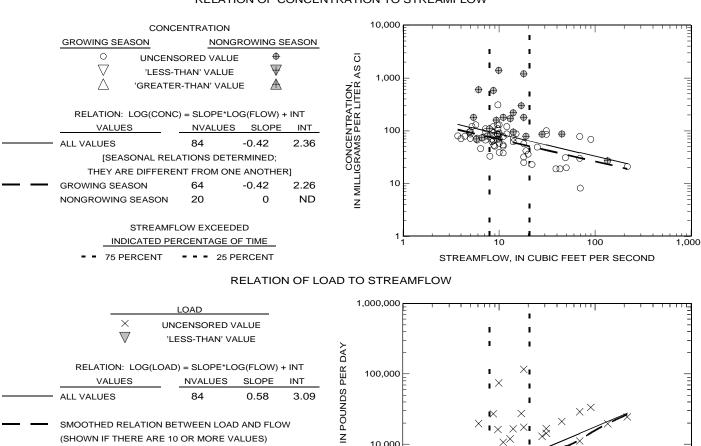
UNCENSORED VALUE



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

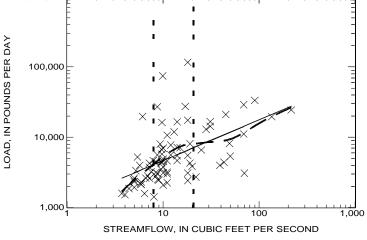
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



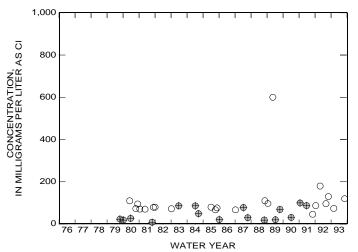
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME

**75 PERCENT** 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
	GREATER-THAN' VALUE	<u> </u>
TRI	ENDS IN CONCENTRATI	ON

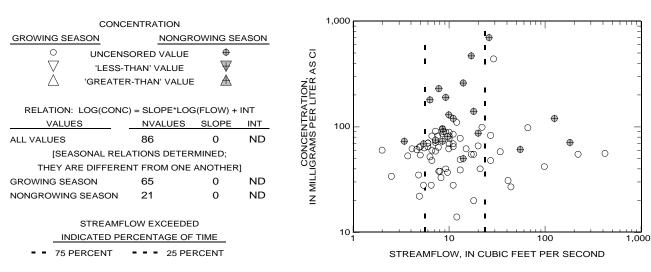
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	22	10	ND
HIGH FLOW	16	11	ND



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	100,000	· · · · · · · · · · · · · · · · · · ·
SMOOTHED RELATION BETWEEN LOAD AND FLOW     (SHOWN IF THERE ARE 10 OR MORE VALUES)	10,000	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	1,000	
	100	10 100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

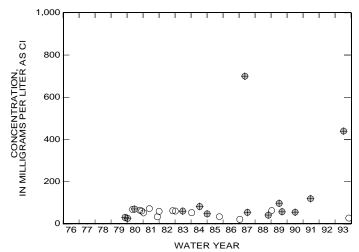
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

HIGH FLOW

, ,	UNCENSORED VALUE  'LESS-THAN' VALUE  'GREATER-THAN' VALUE			
TRENDS IN CONCENTRATION				
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	14	9	ND	
HIGH FLOW	14	11	ND	

CONCENTRATION

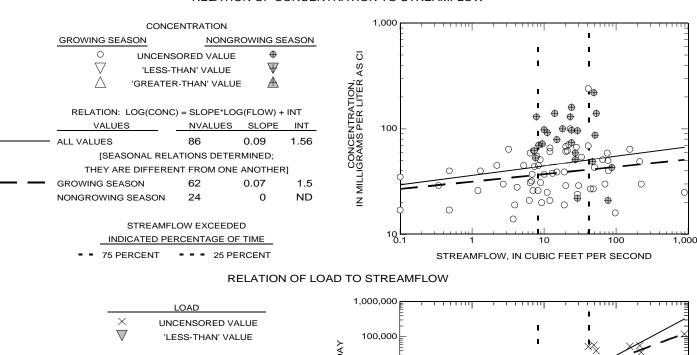
LOW FLOW



# APPENDIX 7. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED CHLORIDE 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

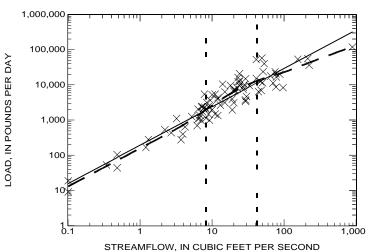


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

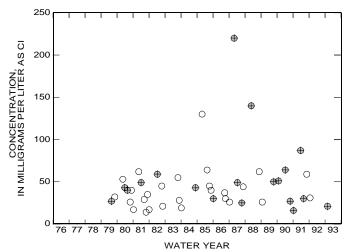
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



CONCENTRATION						
LOW FLOW	•	HIGH FLOW				
0	UNCENSORED VALUE	<b>⊕</b>				
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$				
$\triangle$	'GREATER-THAN' VALUI	<b>≜</b>				

TRENDS IN CONCENTRATION					
	VALUES	NVALUES	NWYS	SLOPE	
	LOW FLOW	27	13	ND	
	HIGH FLOW	19	12	ND	



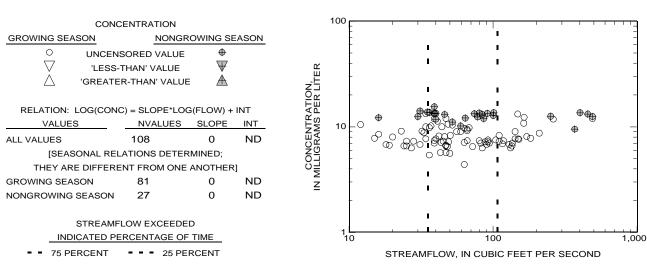
# Appendix 8 Dissolved oxygen

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	10,000 H H H H H H H H H H H H H H H H H
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000 × 1
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	100 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			1 ' '					' '
LOW FLOW	HIGH FLOW							
○ UNCENSORED VALUE  □ 'LESS-THAN' VALUE □ 'GREATER-THAN' VALUE	:	20 LITER 20						_
TRENDS IN CONCENTRAT	TION A	MILLIGRAMS PER LITER  10	-	○ <sub>○</sub>	<b>*</b> •	0	•	- ○ •
LOW FLOW 22 11	ND S	) (5 10		0		<b>+</b>		0 -
HIGH FLOW 25 11	ND É	WILLIAM N	⊕ ⊕ -	• • •			<b>+</b>	0 0 <del>=</del>

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

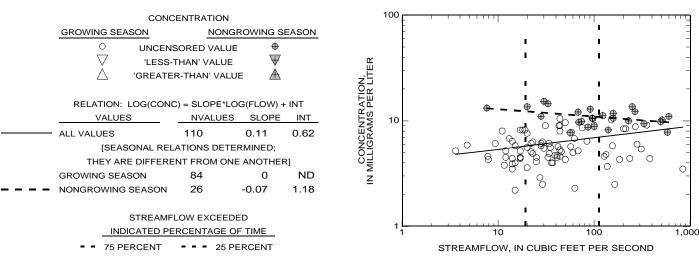
WATER YEAR

25 -

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES 110 1.11 1.35  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000 PER DO 10,000 PER DO 10,
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100 × 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

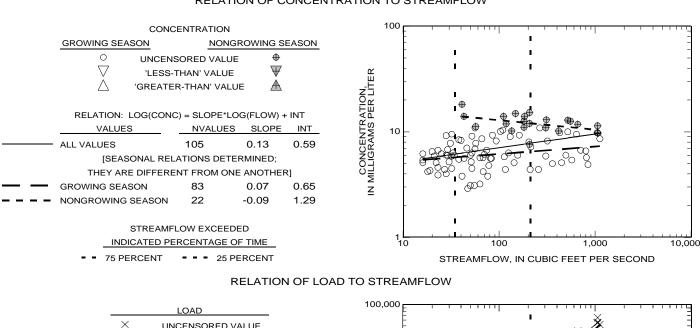
CONCENTRATION		25		1				- 1	- 1	1	$\neg$		1					
LOW FLOW HIGH FLOW																		
O UNCENSORED VALUE	ATION, PER LITER	20																-
TRENDS IN CONCENTRATION		15	F	_								<b>⊕</b>						-
VALUES NVALUES NWYS SLOPE	AMS			0		Φ.						Ψ	4	<b>A</b>		0	<b>,</b>	$\oplus$
LOW FLOW 25 14 ND	SS.	10	<b>D</b>		$\oplus$	₩	<b>⊕</b>	Φ.			$\oplus$		4		₽			_
HIGH FLOW 28 15 0	Ęġ				<b>⊕</b>			Ψ (	<b>#</b>	<b>⊕</b>			O	∌	0€	∌ ∉	₽	0
	CONCENTE IN MILLIGRAMS	5 <sup>(</sup>	<b>)</b>		• •	} C	, @ 		0	•	⊕ ⊕	0	0		○ <b>⊕</b> )	⊕ ⊕	<b>⊕</b>	<u>-</u>
			ı															

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



× UNCENSORED VALUE

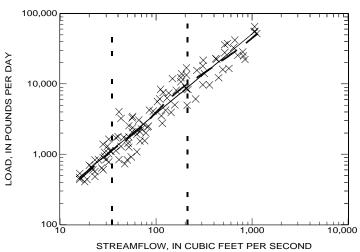
VLESS-THAN' VALUE

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

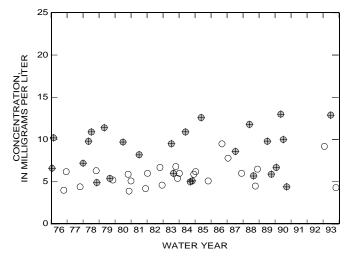
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT

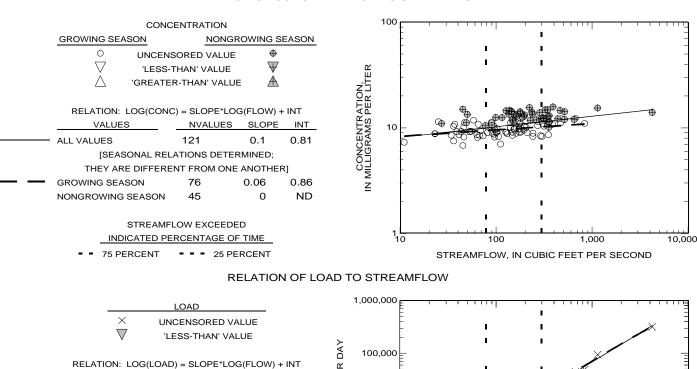


	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>+</b>
V.	'LESS-THAN' VALUE	₩.
Δ	'GREATER-THAN' VALU	E A
тр	ENDS IN CONCENTRAT	ION

TRENDS IN CONCENTRATION								
VALUES	NVALUES	NWYS	SLOPE					
LOW FLOW	25	14	ND					
HIGH FLOW	26	14	0					



#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

LOW FLOW

HIGH FLOW

ALL VALUES

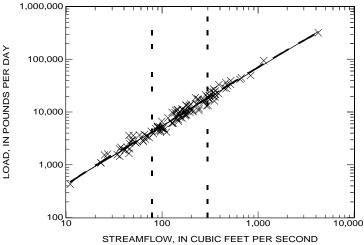
NVALUES

SLOPE

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				
LOW FLOW			HIGH FLOW			
0	UNCENSORE	VALUE	<b>⊕</b>			
√ 'LESS-THAN' VALUE  √						
△ 'o	SREATER-THA	N' VALUE	$\blacksquare$			
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			

14

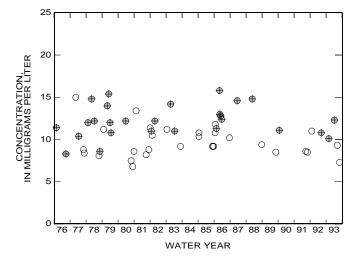
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0

O

30

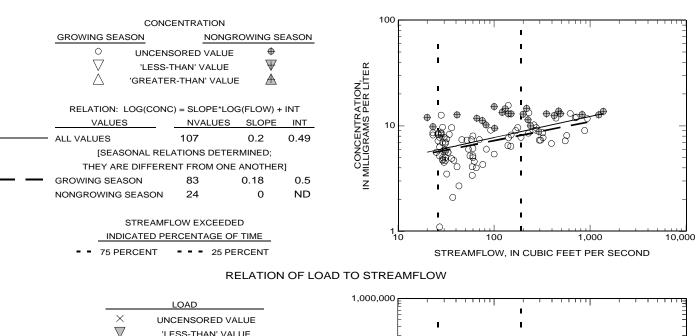
27



### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	L L L L L L L L L L L L L L L L L L L
ALL VALUES 107 1.2 1.22  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10,000 I I I I I I I I I I I I I I I I I
75 PERCENI 25 PERCENI	100 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	RATION				1		' '		' '		' '			'
LOW FLOW			HIGH FLOW												
$\bigvee_{\mathbf{v}}$	UNCENSORE 'LESS-THAN' GREATER-THA	VALUE	⊕ ₩ ±	ATION, PER LITER	20 –										
VALUES LOW FLOW	NDS IN CONC NVALUES 8	NWYS 7	SLOPE ND	CONCENTRATI	15 -		<b>⊕ ⊕</b>	<b>⊕</b>	<b>⊕</b>	·	\$ ○	0		⊕ <sup>⊕</sup>	· ⊕
HIGH FLOW	30	13	0	CO IN MILL	5 –	<b>⊕</b>	⊕ ∉	<del>+</del>	4	• C	<b>\$</b> C	0	)		

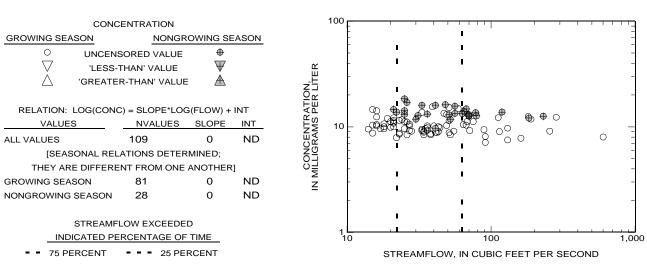
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

25 -

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	<b>&gt;</b>	100,000	1 1		×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW VALUES NVALUES SLOPE	·	10,000	1 1		
ALL VALUES 109 0.99  — SMOOTHED RELATION BETWEEN LOAD AND FL	1.79 SQ NOO O	- - -		××··	-
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	LOAD, IN	1,000			
75 PERCENT 25 PERCENT	-	100		100	1,000
			STREAMFLOW, IN C	UBIC FEET PER S	ECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

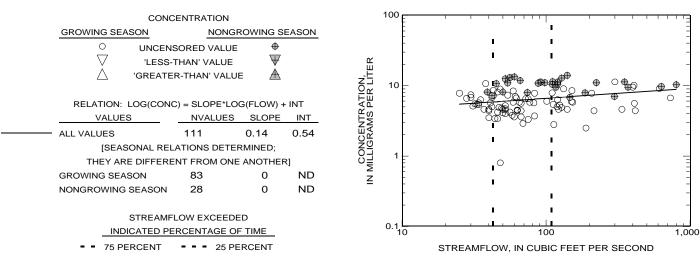
CONCENTRATION		
LOW FLOW	HIGH FLOW	
○ UNCENSORED VALU  VIESS-THAN' VALU  OREATER-THAN' VALU	ne ♥	20 – –
TRENDS IN CONCENTRA	ATION A P	
VALUES NVALUES NWY	S SLOPE Z	
LOW FLOW 23 12	ND Şë 1	
HIGH FLOW 31 16	O O WILLO	
	<u>Z</u>	5 –

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

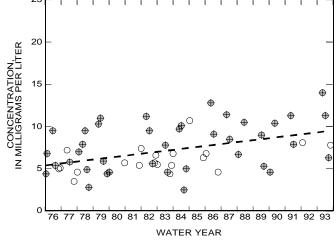
#### RELATION OF CONCENTRATION TO STREAMFLOW



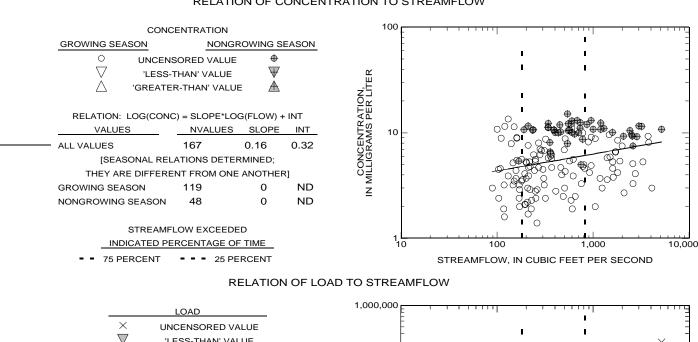
#### RELATION OF LOAD TO STREAMFLOW

LOAD	100,000		
<ul> <li>✓ UNCENSORED VALUE</li> <li>✓ 'LESS-THAN' VALUE</li> </ul>	-		
	10,000		
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000	× ×	-
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT		1 1× 1	=
	100	100  STREAMFLOW, IN CUBIC FEET PER SECO	1,000

					23			
CONCENTRATION								
LOW FLOW	1		HIGH FLOW					
o ∇ Δ	UNCENSORE 'LESS-THAN 'GREATER-THA	'VALUE	<ul><li>⊕</li><li>₩</li><li>A</li></ul>	NO R LITER	20 -			
TF	RENDS IN CONC	CENTRAT	ION	RAT 8 PE	15			
VALUES	NVALUES	NWYS	SLOPE	ΣŽ				
LOW FLO	w 20	11	ND	ACE GR/	10			
HIGH FLO	w 39	15	0.23	A CO	4			
				=	*			



#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD

X UNCENSORED VALUE

VLESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

VALUES

NVALUES

SLOPE

INT

ALL VALUES

167

1.16

1.05

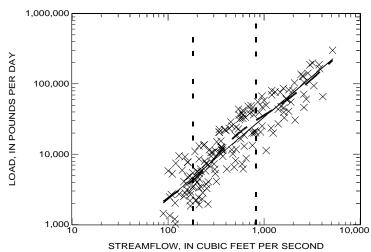
SMOOTHED RELATION BETWEEN LOAD AND FLOW
(SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

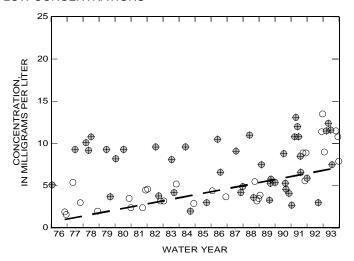
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



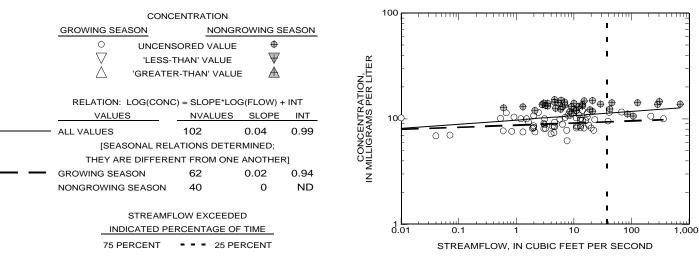
		CONCENTR	ATION	
<u>. I</u>	LOW FLOW			HIGH FLOW
	О U	NCENSORE	D VALUE	<b>⊕</b>
	▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
	△ 'GF	REATER-THA	N' VALUE	Ε Α
	TREN	DS IN CONC	ENTRAT	ION
	VALUES	NVALUES	NWYS	SLOPE
	LOW FLOW	29	14	0.36
	HIGH FLOW	45	17	0



### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	LOAD		100,000	
×	UNCENSORED VALUE 'LESS-THAN' VALUE	<b>&gt;</b>	10,000	
RELATION: LOG VALUES	G(LOAD) = SLOPE*LOG(FLOW)  NVALUES SLOPE	PE TAIL +	1000	
ALL VALUES	102 1.04	1.72	100	
- SMOOTHED RELAT	ION BETWEEN LOAD AND FLO	ow g	Ē	
(SHOWN IF THERE	ARE 10 OR MORE VALUES)	Z O	10	^
STR	REAMFLOW EXCEEDED	LOAI	E F	'
INDICAT	ED PERCENTAGE OF TIME		1	· I
75 PERCE	ENT 25 PERCENT		F	
			0.1 0.01	0.1 1 10 100 1,00
				STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

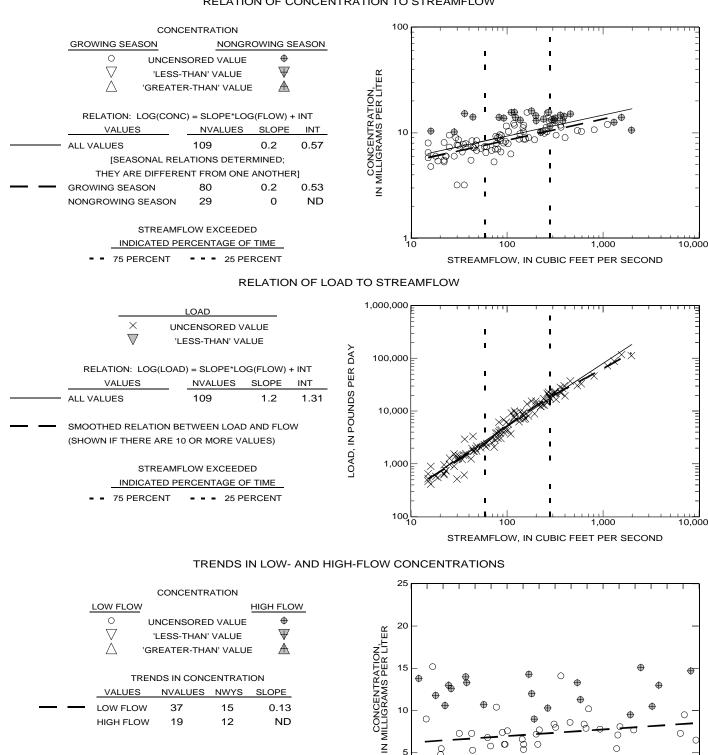
CONCENTRATION				
LOW FLOW	IGH FLOW			
○ UNCENSORED VALUE  VILESS-THAN' VALUE  VILESS-THAN' VALUE	⊕ ₩ ₩ A	_		-
TRENDS IN CONCENTRATION		₩ ₩		— Ф
LOW FLOW 0 0 HIGH FLOW 13 7	MILLIGRAMMY MILLIG	⊕ ⊕	<b>+ + + + + + + + + +</b>	
	≥ <u>Z</u> 5.	_		

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



10

5

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

LOW FLOW

HIGH FLOW

37

19

15

12

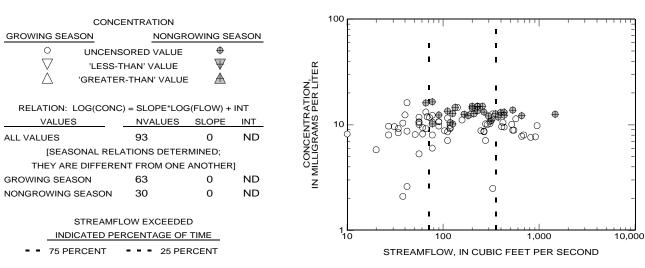
0.13

ND

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				100,000	<del>-                                    </del>		<del></del>	<del></del>
		NCENSORED V			<u>}</u>	-	i 1	ا ا		=
	ON: LOG(LOA	AD) = SLOPE*LO	OG(FLOW) SLOPE	+ INT INT	PER D/	10,000	1		!	
ALL VALUES	S	93	1.07	1.59	NDS	-	×	×	Í	=
		BETWEEN LOAD		W	POL	-	//×'	× I	ı	-
(SHOWN IF	THERE ARE	10 OR MORE V	ALUES)		AD, IN	1,000		I	I I	
		FLOW EXCEED PERCENTAGE O			Ю,		·	1		=
_	5 PERCENT		ERCENT			-	İ	Ī	! !	-
						100		100	1,000	10,000
							STREAMF	LOW, IN CUBI	C FEET PER S	SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			1					' '
LOW FLOW			HIGH FLOW	_						
	INCENSOREI 'LESS-THAN' REATER-THA	VALUE		Ë.	20	-				_
TREA	IDS IN CONC	ENITRAT	ION	CONCENTRATION.	15	-	<b>⊕</b>		C	0 0
VALUES	NVALUES	NWYS	SLOPE_	N S S S				0	<b>*</b>	\$
LOW FLOW	25	7	ND	NCE GRA	10 -	-	0 (	)	• 🕏	<b>⊕ ⊕</b>
HIGH FLOW	19	6	ND	WILLI MILLI			<b>\Phi</b>	<b>₩</b>	φ <b>Φ</b>	, " @
				Z	5	-				0 0
							0		0	

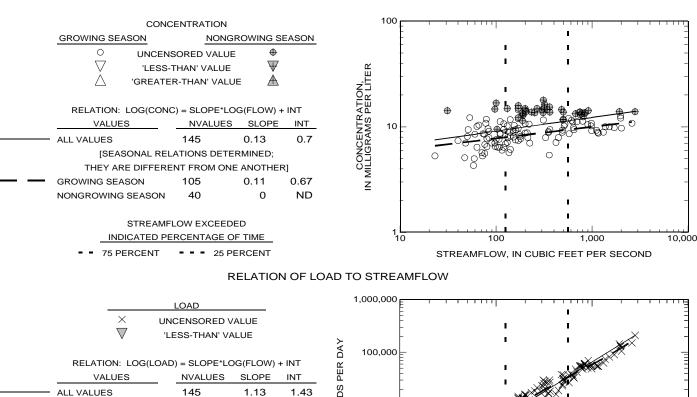
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

25

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

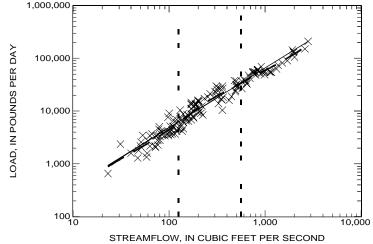


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

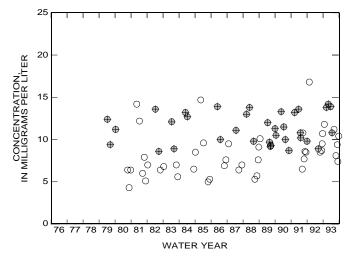
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT

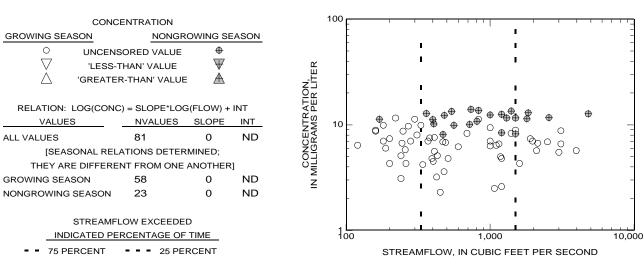


CONCENTRATION	
I	HIGH FLOW
UNCENSORED VALUE	Φ
'LESS-THAN' VALUE	$\overline{\Psi}$
'GREATER-THAN' VALU	E A
RENDS IN CONCENTRAT	TION
	/ UNCENSORED VALUE 'LESS-THAN' VALUE 'GREATER-THAN' VALU

TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	45	13	ND			
HIGH FLOW	35	13	ND			



#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD	1,000,000
$ imes$ uncensored value $ ilde{\mathbb{V}}$ 'Less-Than' value	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	H 100,000 H X X X H
VALUES         NVALUES         SLOPE         INT           ALL VALUES         81         1.05         1.46	— "
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SLOWAN IS THERE ARE 40 OR MORE VALUES)	
(SHOWN IF THERE ARE 10 OR MORE VALUES)	9 10,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	9 ×× · ^
75 PERCENT 25 PERCENT	1000
	1,000 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

25 -

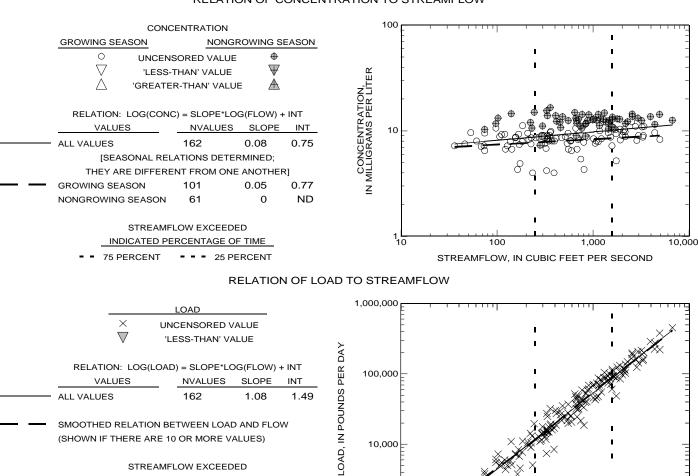
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

	CONCENTR	RATION	
LOW FLOW			HIGH FLOV
Ο υ	JNCENSORE	D VALUE	<b></b>
	LESS-THAN	' VALUE	$\overline{\Psi}$
△ 'G	REATER-THA	AN' VALU	e 🛦
TREN	NDS IN CONC	CENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	20	5	ND
HIGH FLOW	17	4	ND

#### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

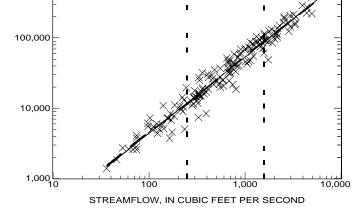
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

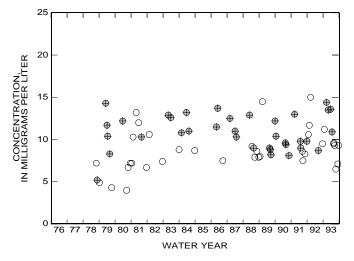


STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME 25 PERCENT 75 PERCENT



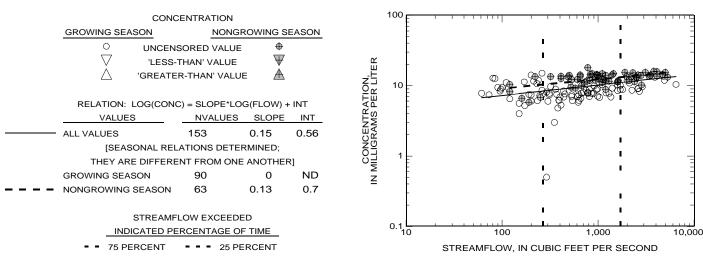
CONCENTRATION							
LOW FLOW			HIGH FLOW				
Ο υ	NCENSORE	D VALUE	<b>⊕</b>				
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$				
△ 'GREATER-THAN' VALUE   ⚠							
TREN	DS IN CONC	ENTRATI	ION				
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	36	13	0				
HIGH FLOW	36	14	0				



### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD	1,000,000	<del></del>	<del>  </del>
× UNCENSORED VALUE	Ē	ı .	
V 'LESS-THAN' VALUE	<u>}</u>	ı	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	100,000 Y		
VALUES NVALUES SLOPE INT	E E		=
ALL VALUES 153 1.15 1.29	FDS	ı	-
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	10,000   N		
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	1,000	i K	_
75 PERCENT 25 PERCENT	F	ı ı	=
	100	100 1,000	10,000
		STREAMELOW IN CUBIC FEET PER SI	ECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

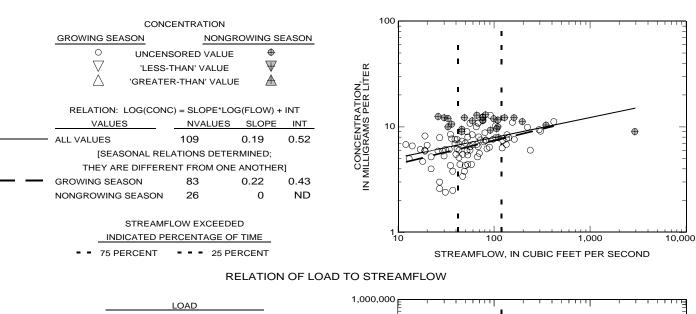
	CONCENTR	RATION				25		1	1				1			Г
LOW FLOW			HIGH FLOW	<u></u>												
٥ ر	INCENSORE	D VALUE	<b>⊕</b>		•	20	_									
$\nabla$	LESS-THAN	VALUE	$\overline{\Psi}$		ËR											
△ 'GI	REATER-THA	AN' VALU	e 🛦		ATION, PER LIT											
					EE		₽	<b>•</b>	4							
TREN	NDS IN CONC	CENTRAT	ION		TRA 1S P		<b>(</b>		Φ.	ФО	0		$\oplus$			
VALUES	NVALUES	NWYS	SLOPE		ΣÃ		<b>#</b>	⊕ €		Ψ()	^	(	Ο.	0		
LOW FLOW	33	12	ND		38.	10	_	0	Ψ	(	) (A)	<b>⊕</b>	<b>⊕</b>	_		
HIGH FLOW	33	13	0		ğΞ			0	⊕ ⊕	0	)	<b>⊕</b>				
					o≣			8		) Č	í			0		
					Z	5	_		8			0			(	)
						-		0								

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD				1,000,000	1 1 1		1 1 1 1 1 1 1		
>	UNCENSORED V			>	-	1	!		/×	- - -
RELATION:	LOG(LOAD) = SLOPE*LO	OG(FLOW)	+ INT	R DA	100,000					
VALUE	S NVALUES	SLOPE	INT	PE	E					=
ALL VALUES	109	1.19	1.25	DS	-	-	i			-
	ELATION BETWEEN LOAI ERE ARE 10 OR MORE V		)W	D, IN POUR	10,000	I I **********************************	!	×		  -  -  -
IND	STREAMFLOW EXCEED			LOA	1,000		<b>*</b> ` '			
= = 75 P	ERCENT = = = 25 F	ERCENT			100	· · · · · · · · · · · · · · · · · · ·			ul i	
					100 10		100	1	1,000	10,00
						STREA	AMFLOW	, IN CUBIC FEET	PER SECONE	)

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

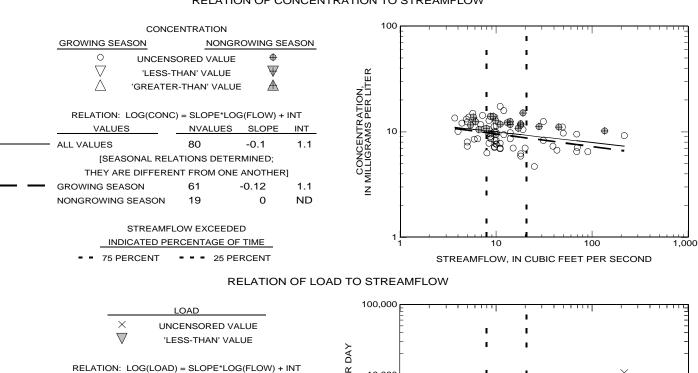
CONCENTRATION		
LOW FLOW HIGH FLOW		
O UNCENSORED VALUE ♥  VIESS-THAN' VALUE ▼  O GREATER-THAN' VALUE ★  TRENDS IN CONCENTRATION	CONCENTRATION, IN MILLIGRAMS PER LITER	5-
VALUES NVALUES NWYS SLOPE	ÄZ	
LOW FLOW 35 15 0	2 <u>6</u> 10	o⊢
HIGH FLOW 18 12 0	CO	
	≥ Z <sub>5</sub>	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



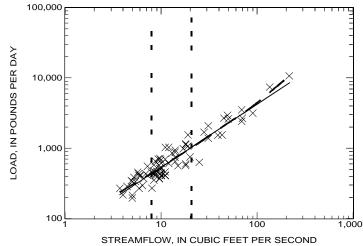
VALUES NVALUES SLOPE INT
ALL VALUES 80 0.9 1.83

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

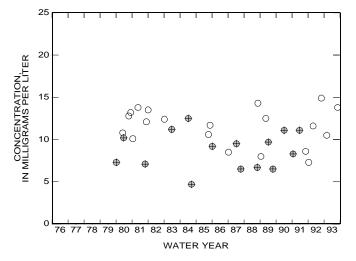
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
Δ,	GREATER-THAN' VALU	e 🕭

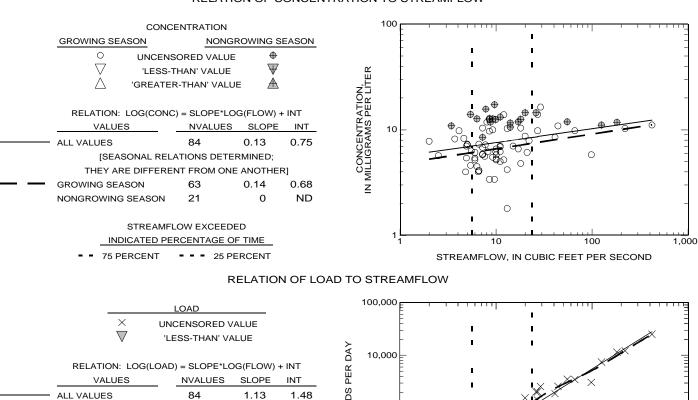
TRENDS IN CONCENTRATION							
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	20	10	ND				
HIGH FLOW	15	10	ND				



### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

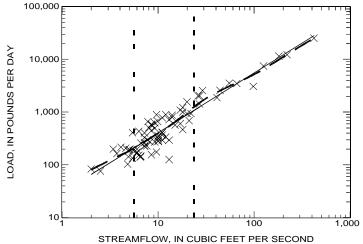


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



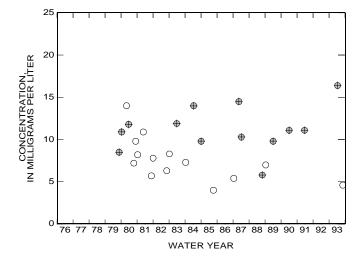
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION						
LOW FLOW			HIGH FLOW			
Ο υ	NCENSORE	O VALUE	<b>⊕</b>			
$\triangle$	LESS-THAN'	VALUE	$\overline{\Psi}$			
△ 'G	REATER-THA	N' VALUE	■ 🛦			
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	14	9	ND			

11

ND

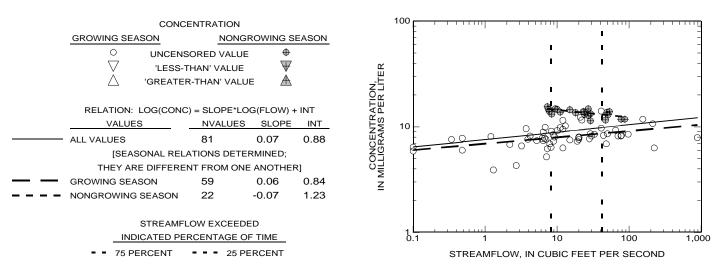
HIGH FLOW



### APPENDIX 8. Relations of constituent concentration and load to streamflow and trends in concentration with time DISSOLVED OXYGEN 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	>	100,000		<del> </del>		
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW   VALUES   NVALUES   SLOPE	·	1,000				
SMOOTHED RELATION BETWEEN LOAD AND FL (SHOWN IF THERE ARE 10 OR MORE VALUES)	.ow NO.	100		<b>**</b> **********************************	1 1	- - - - -
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	- -	10	^	I I 10	100	1,000
			STREAMFLOW	, IN CUBIC FEE	ET PER SECONE	)

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
O UNCENSORED VALUE ♥  VIESS-THAN' VALUE ▼  OREATER-THAN' VALUE ★	N 20	-
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	NTRATIC	
LOW FLOW 27 13 ND HIGH FLOW 18 11 ND	CONCENTRATION, IN MILLIGRAMS PER LIT 0 0 5	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

## Appendix 9

# Fraction of dissolved oxygen at saturation

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

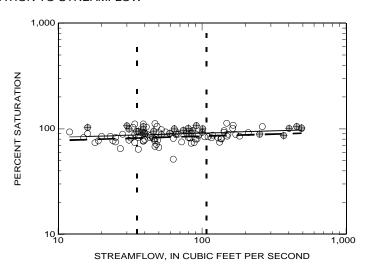
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONG	CENTRATION							
GROWING SEASON	NONG	ROWING SI	EASON					
O UNCEN	SORED VALUE	<b></b>						
√ 'LESS	abla 'LESS-THAN' VALUE $ abla$							
△ 'GREATE	△ 'GREATER-THAN' VALUE  ⚠							
RELATION: LOG(CON	RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT							
VALUES	NVALUES	SLOPE	INT					
ALL VALUES	106	0.04	1.88					
[SEASONAL RE	LATIONS DETE	RMINED;						
THEY ARE DIFFERI	THEY ARE DIFFERENT FROM ONE ANOTHER]							
GROWING SEASON	79	0.04	1.85					
NONGROWING SEASON	27	0	ND					
STREAMF	FLOW EXCEEDE	ĒD						

75 PERCENT

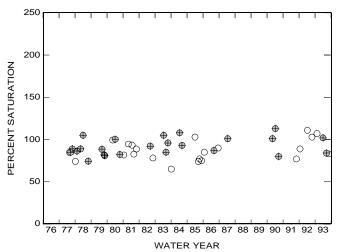
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

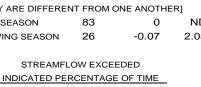
LOW FLOW			HIGH FLOW			
0	UNCENSORE	D VALUE	<b>⊕</b>			
$\nabla$	'LESS-THAN' VALUE					
	'GREATER-THAN' VALUE					
TRE	ENDS IN CONC	ENTRAT	ION			
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	22	11	ND			
HIGH FLOV	v 24	11	ND			



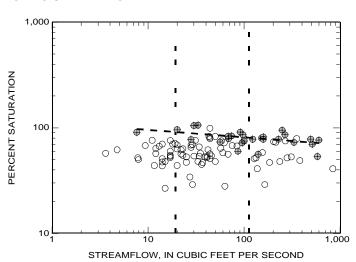
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON	NONGE	ROWING SE	EASON	
O UNCENS	SORED VALUE	<b>Φ</b>		
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$		
	R-THAN' VALUI	E A		
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT				
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	109	0	ND	
[SEASONAL RELATIONS DETERMINED;				
THEY ARE DIFFERENT FROM ONE ANOTHER]				
GROWING SEASON	83	0	ND	
 NONGROWING SEASON	26	-0.07	2.05	
STREAMFLOW EXCEEDED				

**75 PERCENT** 



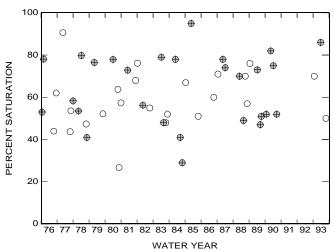
- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	24	14	ND
HIGH FLOW	28	15	0

CONCENTRATION



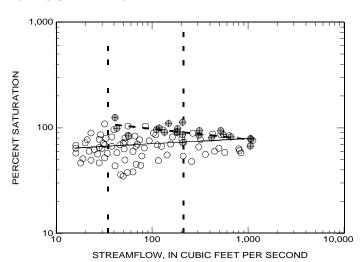
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON	NONGF	ROWING SE	EASON	
O UNCENS	SORED VALUE	Φ		
V 'LESS-	THAN' VALUE	$\overline{\Psi}$		
	R-THAN' VALUI			
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT				
VALUES	NVALUES	SLOPE	INT	
 ALL VALUES	101	0.05	1.75	
[SEASONAL RELATIONS DETERMINED;				
THEY ARE DIFFERENT FROM ONE ANOTHER]				
GROWING SEASON	79	0	ND	
 NONGROWING SEASON	22	-0.1	2.19	

STREAMFLOW EXCEEDED

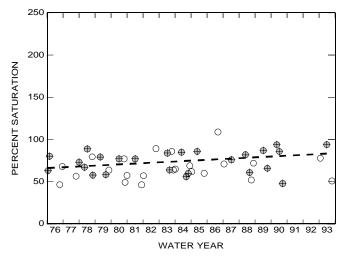
INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

_	LOW FLOW			HIGH FLOW
	Ο υ	NCENSORE	D VALUE	<b>⊕</b>
	▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
	△ 'GF	REATER-THA	N' VALUE	■ ▲
	TREN	IDS IN CONC	ENTRAT	ION
	VALUES	NVALUES	NWYS	SLOPE
	LOW FLOW	23	14	ND
	HIGH FLOW	25	14	0.98

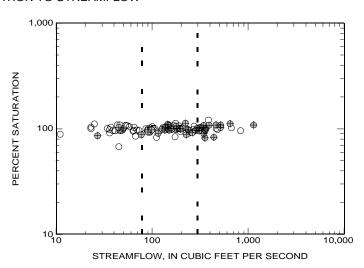


#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEASO				
O UNCENS	ORED VALUE	<b></b>		
√ 'LESS-T	HAN' VALUE	$\forall$		
	R-THAN' VALUE	: <u>A</u>		
RELATION: LOG(CONC	) = SLOPE*LOG	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	115	0	ND	
[SEASONAL RELATI	ONS NOT DET	ERMINED;		
THEY ARE NOT DIFFER	RENT FROM ON	NE ANOTHE	ER]	
GROWING SEASON	72	ND	ND	
NONGROWING SEASON	43	ND	ND	
STREAMFLOW EXCEEDED				
INDICATED PERCENTAGE OF TIME				

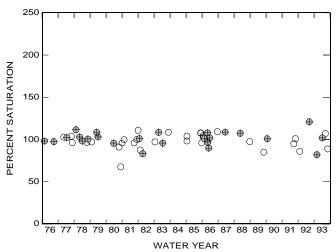
= = 25 PERCENT

75 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
O U	NCENSORE	D VALUE	<b></b>
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	30	14	0
HIGH FLOW	25	13	0



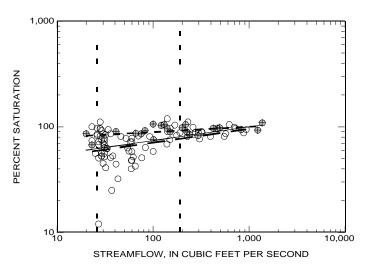
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION			
GROWING SEASON	NONGE	ROWING SE	EASON
O UNCEN	SORED VALUE	<b></b>	
√ 'LESS-THAN' VALUE  ▼			
△ 'GREATER-THAN' VALUE ▲			
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT			
VALUES	NVALUES	SLOPE	INT
 ALL VALUES	106	0.13	1.61
[SEASONAL REL	ATIONS DETER	RMINED;	
THEY ARE DIFFERENT FROM ONE ANOTHER]			
 GROWING SEASON	83	0.13	1.59
 NONGROWING SEASON	23	0.05	1.85
STREAME	LOW EXCEEDE	D	

**75 PERCENT** 

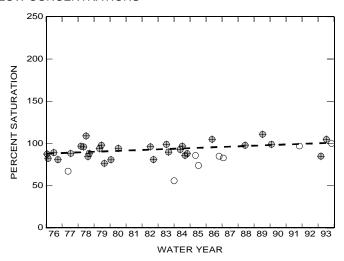
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	00.102.11.10.1			
<u>_</u>	LOW FLOW			HIGH FLOW
	Ο υ	NCENSORE	D VALUE	<b>⊕</b>
	$\triangle$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
	△ 'GF	REATER-THA	N' VALUE	<b>A</b>
	TREN	DS IN CONC	ENTRATI	ON
	VALUES	NVALUES	NWYS	SLOPE
	LOW FLOW	8	7	ND
	HIGH FLOW	29	13	0.72



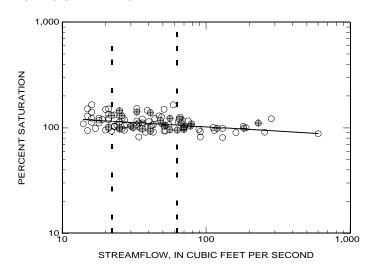
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION			
WING SEASON	NONGF	ROWING SE	EASON
O UNCENS	SORED VALUE	<b>•</b>	
V 'LESS-	ΓHAN' VALUE	₩.	
△ 'GREATE	R-THAN' VALUE	■ 🛦	
ELATION: LOG(CONC	C) = SLOPE*LO	G(FLOW) +	INT
VALUES	NVALUES	SLOPE	INT
/ALUES	108	-0.08	2.17
[SEASONAL RELAT	IONS NOT DET	ERMINED;	
THEY ARE NOT DIFFERENT FROM ONE ANOTHER]			ER]
WING SEASON	80	ND	ND
GROWING SEASON	28	ND	ND
STREAMFI	LOW EXCEEDE	:D	
	OWING SEASON  O UNCENS  VIESS- O'GREATEI  ELATION: LOG(CONC  VALUES  VALUES  [SEASONAL RELAT HEY ARE NOT DIFFEI WING SEASON GROWING SEASON	OWING SEASON NONGF  O UNCENSORED VALUE  VIESS-THAN' VALUE  'GREATER-THAN' VALUE  ELATION: LOG(CONC) = SLOPE*LOG  VALUES NVALUES  VALUES 108  [SEASONAL RELATIONS NOT DET  HEY ARE NOT DIFFERENT FROM OF  WING SEASON 80  GROWING SEASON 28	WING SEASON  O UNCENSORED VALUE  VILESS-THAN' VALUE  O'GREATER-THAN' VALUE  ELATION: LOG(CONC) = SLOPE*LOG(FLOW) +  VALUES  NVALUES  VALUES  108  O.08  [SEASONAL RELATIONS NOT DETERMINED; HEY ARE NOT DIFFERENT FROM ONE ANOTH WING SEASON  80  ND

75 PERCENT

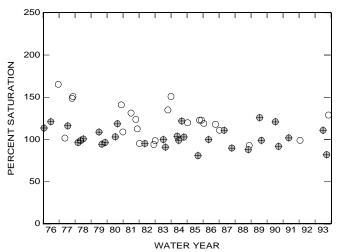
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	00.102.111		
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	O VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	23	12	ND
HIGH FLOW	30	16	0



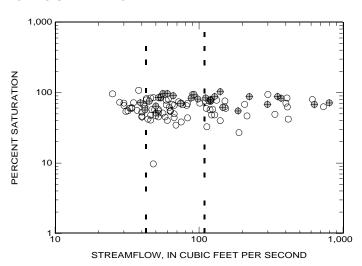
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON	NONGR	OWING SE	ASON	
O UNCENSO	DRED VALUE	<b></b>		
√ 'LESS-T⊦	IAN' VALUE	$\overline{\Psi}$		
△ 'GREATER-	THAN' VALUE	$\triangle$		
RELATION: LOG(CONC)	= SLOPE*LOG	(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	110	0	ND	
[SEASONAL RELA	TIONS DETER	MINED;		
THEY ARE DIFFEREN	T FROM ONE	ANOTHER]	l	
GROWING SEASON	83	0	ND	
NONGROWING SEASON	27	0	ND	
STREAMFLOW EXCEEDED				

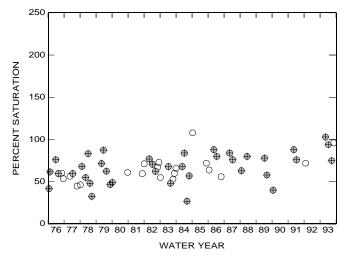
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT

75 PERCENT



CONCENTRATION				
LOW FLOW			HIGH FLOW	
O U	NCENSOREI	D VALUE	<b>Φ</b>	
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$	
△ 'GF	REATER-THA	N' VALUE	■ ▲	
TREN	DS IN CONC	ENTRAT	ION	
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	20	11	ND	
HIGH FLOW	38	15	0	



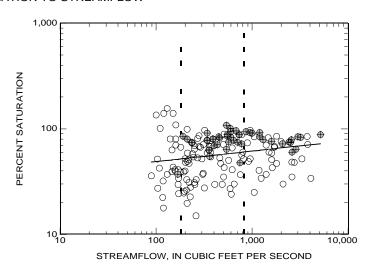
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON	NONGR	OWING SE	EASON	
'LESS-	SORED VALUE THAN' VALUE R-THAN' VALUE	<ul><li>⊕</li><li>₩</li><li>A</li></ul>		
RELATION: LOG(CONG	C) = SLOPE*LOG NVALUES	G(FLOW) + SLOPE	INT INT	
 ALL VALUES	165	0.1	1.49	
[SEASONAL REL	ATIONS DETER	MINED;		
THEY ARE DIFFERE	NT FROM ONE	ANOTHER	<b>t</b> ]	
GROWING SEASON	117	0	ND	
NONGROWING SEASON	48	0	ND	
STREAMF	LOW EXCEEDE	D		

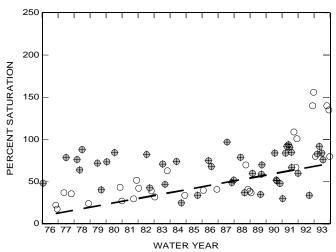
**75 PERCENT** 

INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>+</b>
$\triangle$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
 LOW FLOW	29	14	3.46
HIGH FLOW	44	17	0



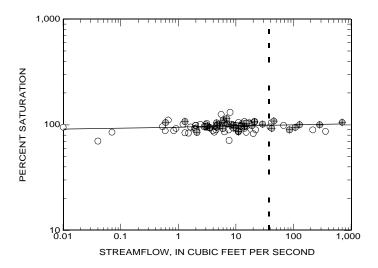
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROW			EASON	
O UNCENS	SORED VALUE	<b></b>		
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$		
△ 'GREATE	R-THAN' VALUI	■ ▲		
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT				
VALUES	NVALUES	SLOPE	INT	
 ALL VALUES	100	0.01	1.98	
[SEASONAL RELAT	IONS NOT DET	ERMINED;		
THEY ARE NOT DIFFERENT FROM ONE ANOTHER]				
GROWING SEASON	61	ND	ND	
NONGROWING SEASON	39	ND	ND	
STREAMFI	LOW EXCEEDE	D		

75 PERCENT

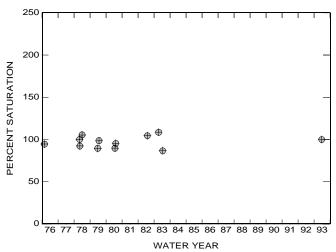
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW	1			HIGH FLOW
0	UNC	CENSOR	RED VALUE	<b>⊕</b>
$\nabla$	'LE	SS-THA	N' VALUE	$\overline{\Psi}$
$\triangle$	'GRE	ATER-TI	HAN' VALUI	E A
TF	REND	S IN COI	NCENTRAT	ION
VALUES	1	VALUE	S NWYS	SLOPE
LOW FLO	W	0	0	ND
HIGH FLO	W	12	7	ND



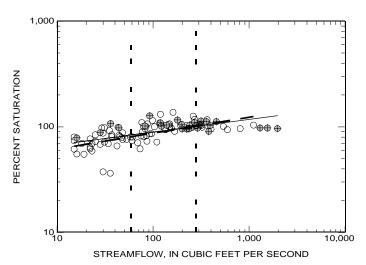
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON	NONGE	ROWING SE	EASON	
O UNCENS	SORED VALUE	<b>Φ</b>		
√ 'LESS-	ΓHAN' VALUE	$\overline{\Psi}$		
△ 'GREATE	R-THAN' VALUI	E A		
RELATION: LOG(CONC	) = SLOPE*LO	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
 ALL VALUES	107	0.12	1.71	
[SEASONAL REL	ATIONS DETER	RMINED;		
THEY ARE DIFFERE	NT FROM ONE	ANOTHER	<b>!</b> ]	
 GROWING SEASON	79	0.15	1.64	
NONGROWING SEASON	28	0	ND	
STREAMFI	_OW EXCEEDE	ED		

75 PERCENT

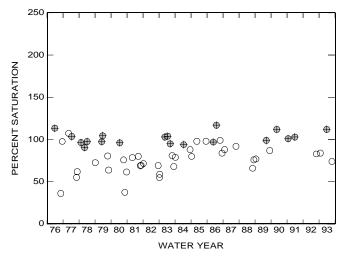
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
О U	NCENSORE	D VALUE	<b>⊕</b>
▽ ,	LESS-THAN	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	<b>A</b>
TREN	IDS IN CONC	ENTRAT	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	37	15	0
HIGH FLOW	19	12	ND

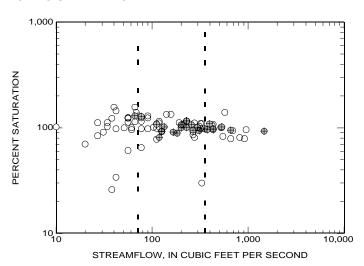


#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEAS			ASON	
O UNCENS	ORED VALUE	<b>(</b>		
√ 'LESS-T	'HAN' VALUE	$\overline{\Psi}$		
	R-THAN' VALUE	<u> </u>		
RELATION: LOG(CONC	) = SLOPE*LOG	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	91	0	ND	
[SEASONAL RELATI	ONS NOT DET	ERMINED;		
THEY ARE NOT DIFFER	RENT FROM ON	IE ANOTHE	ER]	
GROWING SEASON	63	ND	ND	
NONGROWING SEASON	28	ND	ND	
STREAMFLOW EXCEEDED				
INDICATED PERCENTAGE OF TIME				

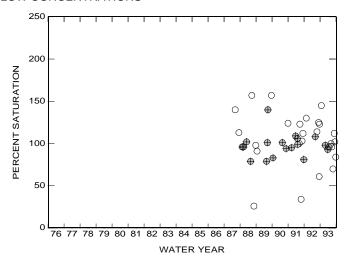
- - 25 PERCENT

75 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b></b>
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	25	7	ND
HIGH FLOW	19	6	ND



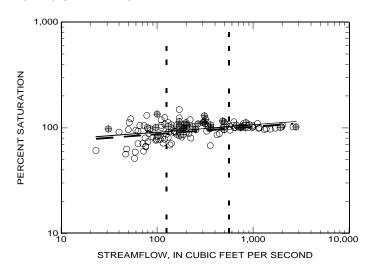
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION				
GI	GROWING SEASON NONGROWING SEASO				
	'LE:	ENSORED VALUE SS-THAN' VALUE ATER-THAN' VALUE	<b>₩ ₩ A</b>		
	RELATION: LOG(CO	ONC) = SLOPE*LO	G(FLOW) +	INT	
	VALUES	NVALUES	SLOPE	INT	
——— AL	L VALUES	142	0.07	1.82	
	[SEASONAL I	RELATIONS DETER	RMINED;		
	THEY ARE DIFFE	ERENT FROM ONE	ANOTHER	<b>?</b> ]	
— — GF	ROWING SEASON	102	0.07	1.8	
NC	ONGROWING SEASO	N 40	0	ND	
	STREA	MFLOW EXCEEDE	:D		

**75 PERCENT** 

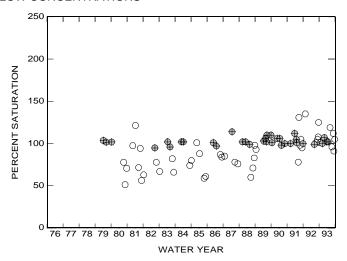
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>+</b>
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	45	13	ND
HIGH FLOW	34	13	ND

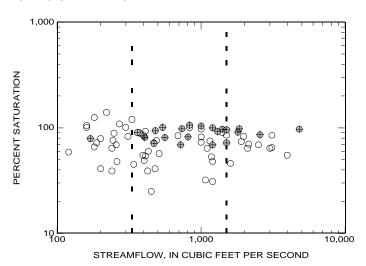


#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEASON				
O UNCENSO	ORED VALUE	<b></b>		
√ 'LESS-TH	IAN' VALUE	$\forall$		
△ 'GREATER-	THAN' VALUE	: <u>A</u>		
RELATION: LOG(CONC)	= SLOPE*LOG	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	79	0	ND	
[SEASONAL RELA	TIONS DETER	MINED;		
THEY ARE DIFFEREN	T FROM ONE	ANOTHER:	l	
GROWING SEASON	56	0	ND	
NONGROWING SEASON	23	0	ND	
STREAMFLOW EXCEEDED				
INDICATED PERCENTAGE OF TIME				

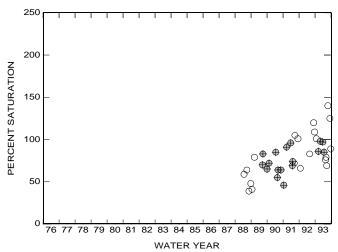
- - 25 PERCENT

75 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	<b>A</b>
TREN	IDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	19	5	ND
HIGH FLOW	17	4	ND



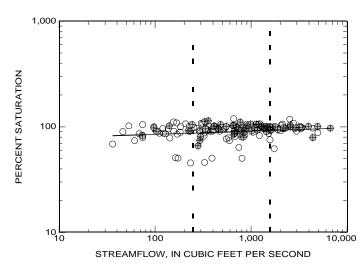
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION				
GROWING SEA	GROWING SEASON		OWING SE	ASON	
	UNCENSOR 'LESS-THA 'GREATER-TI	N' VALUE	<b>⊕</b> ₩ <b>≜</b>		
	LOG(CONC) =		,		
VALUES	<u> </u>	NVALUES	SLOPE	INT	
ALL VALUES	1	59	0.03	1.87	
[SEASO]	[SEASONAL RELATIONS NOT DETERMINED;				
THEY ARE N	THEY ARE NOT DIFFERENT FROM ONE ANOTHER]				
GROWING SEA	SON	98	ND	ND	
NONGROWING	SEASON	61	ND	ND	
STREAMFLOW EXCEEDED					

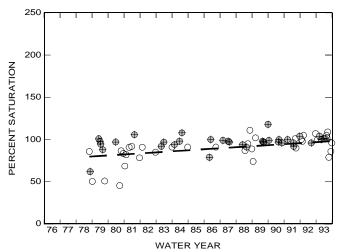
75 PERCENT

INDICATED PERCENTAGE OF TIME

- - 25 PERCENT

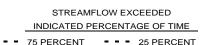


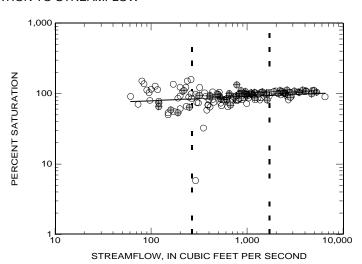
	CONCENTRATION			
LOW FLOW	1		HIGH FLOW	
0	UNCENSORE	D VALUE	<b></b>	
$\nabla$	'LESS-THAN	'LESS-THAN' VALUE		
$\triangle$	'GREATER-THA	N' VALUE	E A	
TR	TRENDS IN CONCENTRATION			
VALUES	NVALUES	NWYS	SLOPE	
— LOW FLOV	N 35	13	1.21	
HIGH FLO	w 36	14	0	



#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON	NONGR	OWING SE	ASON	
O UNCEN	SORED VALUE	<b></b>		
C 'LESS-	THAN' VALUE	$\overline{\Psi}$		
	R-THAN' VALUE	■ ▲		
RELATION: LOG(CONG	C) = SLOPE*LO	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
 ALL VALUES	151	0.06	1.78	
[SEASONAL RELATIONS NOT DETERMINED;				
THEY ARE NOT DIFFERENT FROM ONE ANOTHER]				
GROWING SEASON	89	ND	ND	
 NONGROWING SEASON	62	ND	ND	





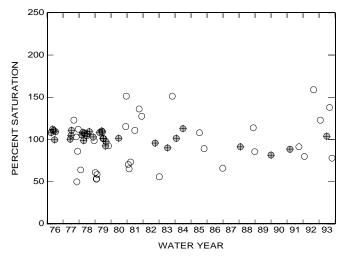
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

HIGH FLOW

Ο υ	UNCENSORED VALUE			
$\triangle$	'LESS-THAN' VALUE			
△ 'GI	'GREATER-THAN' VALUE			
TRENDS IN CONCENTRATION				
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	33	12	ND	
HIGH FLOW	32	12	ND	

CONCENTRATION

LOW FLOW

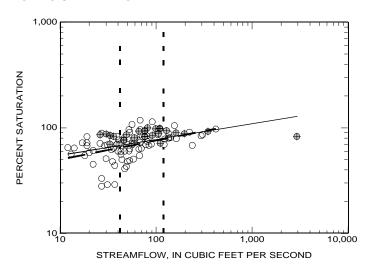


#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION								
GROWING SEAS	ON NO	ONGROWING S	EASON						
	UNCENSORED V 'LESS-THAN' VA	ALUE #							
RELATION: L	OG(CONC) = SLOF	PE*LOG(FLOW) + LUES SLOPE	- INT INT						
ALL VALUES	107	0.15	1.59						
[SEASC	NAL RELATIONS	DETERMINED;							
THEY ARE	DIFFERENT FROM	M ONE ANOTHER	۲]						
GROWING SEAS	ON 81	0.18	1.52						
NONGROWING S	SEASON 26	0	ND						
_	STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME								

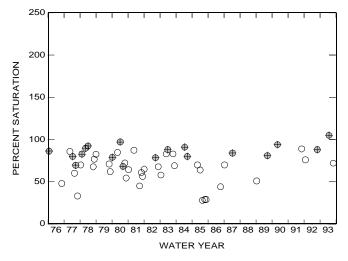
75 PERCENT

- - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
Ο υ	<b>+</b>		
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	<b>A</b>
TREN	DS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	35	15	0
HIGH FLOW	18	12	0



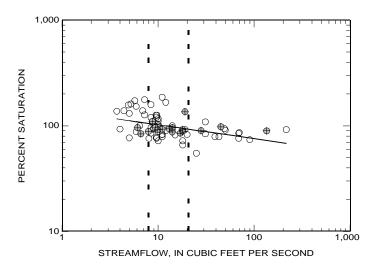
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION									
GROWING SEA	SON	NONGR	OWING SE	ASON						
0	UNCENSOR	RED VALUE	<b>Φ</b>							
$\nabla$	'LESS-THA	N' VALUE	$\overline{\Psi}$							
$\triangle$	'GREATER-T	HAN' VALUE	$\triangle$							
RELATION:	LOG(CONC) =	SLOPE*LOG	(FLOW) +	INT						
VALUE	<u> </u>	NVALUES	SLOPE	INT						
ALL VALUES		77 -	-0.13	2.14						
[SEASOI	NAL RELATION	NS NOT DET	ERMINED;							
THEY ARE I	NOT DIFFERE	NT FROM ON	IE ANOTH	ER]						
GROWING SEA	SON	60	ND	ND						
NONGROWING	SEASON	17	ND	ND						
	STREAMFLOW EXCEEDED									

75 PERCENT

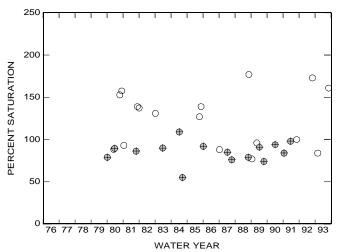
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW			
٥ ر	<b>⊕</b>					
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$			
△ 'GI	REATER-THA	N' VALUE	■ ▲			
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	17	10	ND			
HIGH FLOW	15	10	ND			

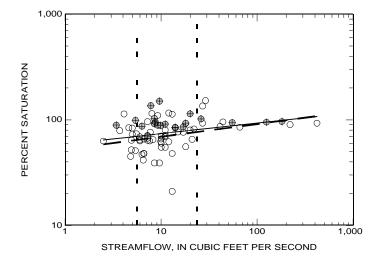


#### RELATION OF CONCENTRATION TO STREAMFLOW

(	CONCENTRATION										
GROWING SEASON	NONGROWING SEASON										
, 'L	ICENSORED VALUE  ESS-THAN' VALUE  EATER-THAN' VALUE										
RELATION: LOG( VALUES	RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT										
ALL VALUES	81 0.1 1.77										
[SEASONAL	RELATIONS DETERMINED;										
THEY ARE DIF	FERENT FROM ONE ANOTHER]										
GROWING SEASON	60 0.12 1.72										
NONGROWING SEAS	SON 21 0 ND										
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME											

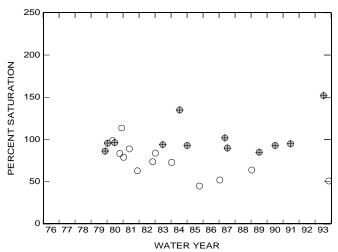
- - 25 PERCENT

75 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
Ο υ	<b>⊕</b>		
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$
∕\ 'GF	<b>A</b>		
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	13	9	ND
HIGH FLOW	12	10	ND



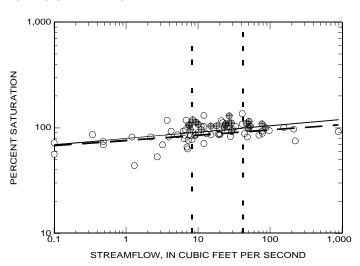
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION								
GROWING SEAS	SON	NONGRO	OWING SE	ASON					
•	UNCENSORE	D VALUE	<b>+</b>						
$\nabla$	'LESS-THAN	VALUE	$\overline{\Psi}$						
$\triangle$	'GREATER-THA	AN' VALUE	$\mathbb{A}$						
RELATION: L	RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT								
VALUES	N	VALUES	SLOPE	INT					
ALL VALUES	79	9	0.06	1.9					
[SEASO	[SEASONAL RELATIONS DETERMINED;								
THEY ARE	DIFFERENT FF	ROM ONE A	NOTHER]						
GROWING SEAS	50N 57	7	0.05	1.88					
NONGROWING S	SEASON 22	2	0	ND					
\$	STREAMFLOW EXCEEDED								

75 PERCENT

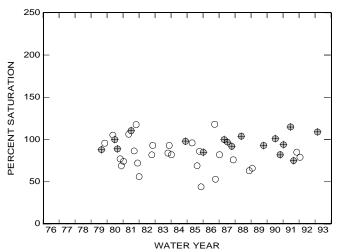
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTION						
LOW FLOW	HIGH FLOW					
Ο υ	<ul> <li>UNCENSORED VALUE</li> </ul>					
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$			
△ 'GF	REATER-THA	N' VALUE	■ ▲			
TREN	DS IN CONC	ENTRAT	ON			
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	27	13	ND			
HIGH FLOW	17	11	ND			



# Appendix 10 Total phosphorus

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

# APPENDIX 10. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL PHOSPHORUS 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	CENTRATION				1 E	1 1	1 1 1	<del></del>	1 1	1 1 1	_
GROWING SEASON	NONGR	OWING S	EASON		ļ.			ī			
O UNCEN	SORED VALUE	<b></b>		۵	F		I	1			
√ 'LESS-	THAN' VALUE	$\forall$		AS	f		I	ı		$\oplus$	
	R-THAN' VALUE	<u> </u>		ŽΫ́	t			C	)		
				은특	-	0	_	<b>!</b> 0			
RELATION: LOG(CON	C) = SLOPE*LOC	(FLOW) +	- INT	R.R.		00 (	10	600	$\circ$		
VALUES	NVALUES	SLOPE	INT	CONCENT! GRAMS PE	0.1	00 0	<u>۾</u> ۾		0		
ALL VALUES	107	0	ND	S N N	Ē	m 9	<u>,</u> 000 00	b			
[SEASONAL REL	ATIONS DETER	MINED;		SA A	- 0				0	Φ.	
THEY ARE DIFFERE	NT FROM ONE	ANOTHER	R]	_	-	00 00		<b>***</b> O***O	$\circ \oplus$	•	
GROWING SEASON	80	0	ND	Z Z	+		<b>⊕</b>	o •		$\oplus$	
NONGROWING SEASON	27	0	ND	Z	L		• •			0	
										, ,	
STREAMF	LOW EXCEEDE	D			0.01	. \	· 'l · \				
INDICATED PE	RCENTAGE OF	TIME		,	0.01 10	<b>A</b>	₩	100			
- 75 PERCENT	25 PE	RCENT				STREAM	IFLOW, IN	CUBIC FEE	T PER S	ECOND	

#### RELATION OF LOAD TO STREAMFLOW

$\overline{\mathbb{V}}$	UNCENSORED V			<b>&gt;</b>	-	1	
,	LOAD) = SLOPE*LO			PER D,	100	. •	×××
VALUES ALL VALUES	NVALUES 107	1.03	-0.53	OUNDS P	E	· · · · · · · · · · · · · · · · · · ·	
SMOOTHED RELATION			DW .	IN POUR	10		× ×
	:AMFLOW EXCEED ED PERCENTAGE (			LOAD,		××××××××××××××××××××××××××××××××××××××	. \
75 PERCE	NT = = = 25 P	ERCENT			1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

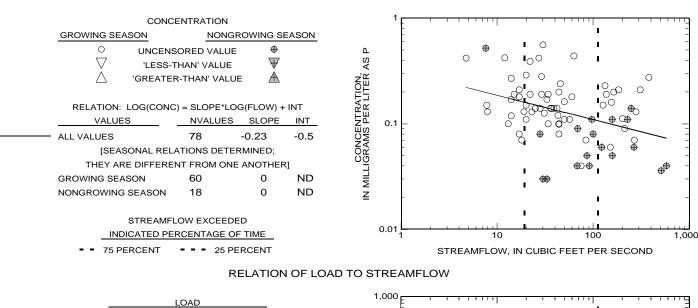
CONCENTRATION	0.9	.5		1	ı ı	1 1	<del></del>		ı	1 1	
LOW FLOW     HIGH FLOW       ○     UNCENSORED VALUE     ⊕       ○     'LESS-THAN' VALUE     ₩       △     'GREATER-THAN' VALUE     ★	ION, TER AS P	.4 —	<b>⊕</b>								_
TRENDS IN CONCENTRATION VALUES NVALUES NWYS SLOPE	CONCENTRATION, IN MILLIGRAMS PER LITER O :: 0	.3 –		<b>⊕</b>							_
LOW FLOW         22         11         ND           HIGH FLOW         25         11         ND	CONC LIGRAM:	.2 –	0		0	Φ.				<del>•</del>	_ _
	<u>Z</u> 0.	.1 –	°			<b>♣</b> 0 ○ ⊕ ⊕	, <b>o</b> •	<b>+</b>	æ	o d	o o - - ••••••
	0.0	.0 76	$\overline{\mathbb{A}}$	79 80	81 8	2 83 84	85 86	87 88	89 90	91	92 93

1,000

STREAMFLOW, IN CUBIC FEET PER SECOND

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



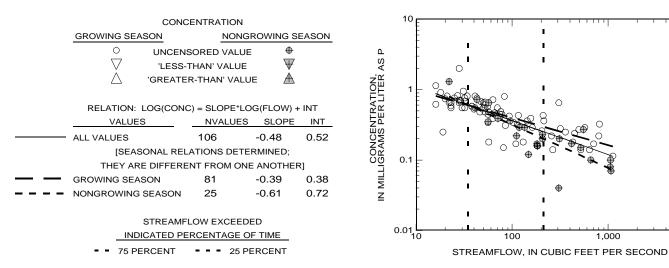
LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	Ϋ́	1,000		I I	' × ' × ' ×	-
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + IN  VALUES NVALUES SLOPE IN	III	100		× × ×		(
ALL VALUES 78 0.77 0	0.23	- - -	×		×××	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	N PC	10 =	× '> × '>		( <sub>1</sub>	
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	LOAD	Ē	/* ×	× ×	1	= - -
75 PERCENT 25 PERCENT		1	10	1 1	I 00	1,000
			STREAMFLOW,	IN CUBIC FEET F	PER SECOND	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		1.0		
O UNCENSORED VALUE  ○ 'LESS-THAN' VALUE  ○ 'GREATER-THAN' VALUE	HEW AS P	0.8	_	_
TRENDS IN CONCENTRATION VALUES NVALUES NWYS S	CONCENTRATION.	0.6	0	_
LOW FLOW         15         9           HIGH FLOW         21         10	I GONO DI DI GENERALI DE CONO DI DI CONO DI CO	0.4	_ 0	○ ⊕
	IN MIL	0.2	<b>+</b>	83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

10,000

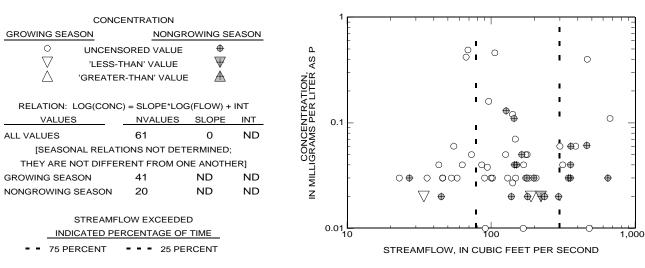
LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
	1,000 X X X X X X X X X X X X X X X X X X
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	TOO X X I X X X I X X X I X
	10 100 1,000 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE	വ ഗ 2.0	_
abla 'LESS-THAN' VALUE $ abla$	⋖	
riangle 'GREATER-THAN' VALUE $ riangle$	JON, TER,	
	<u></u>	5 -
TRENDS IN CONCENTRATION	PER.	0
VALUES NVALUES NWYS SLOPE		0
LOW FLOW 24 13 ND	CONCE GRAMS	
HIGH FLOW 25 14 0	00 80	
	N WILL N W 0.5	
	Z	• • • •

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

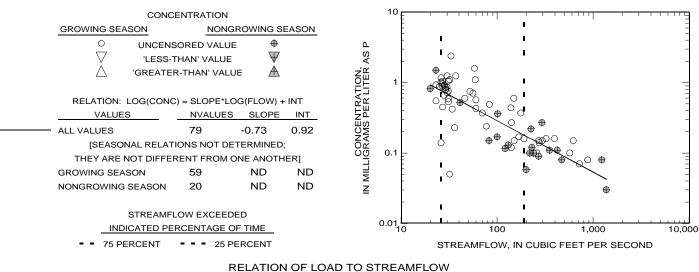
LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	<b>&gt;</b>	1,000	I I	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)	) + INT	1,000	, , , , , , , , , , , , , , , , , , ,	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
SMOOTHED RELATION BETWEEN LOAD AND FLO (SHOWN IF THERE ARE 10 OR MORE VALUES)	OW OO NI	100		× × -
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	POPE	10	1 × × × × × × × × × × × × × × × × × × ×	1,000
			STREAMFLOW, IN CUBIC FEET PER	SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	(	0.5	1 1	1 1	- 1	1 1	ı	ı	1 1	1 4	<u> </u>	-	1	
LOW FLOW HIGH FLO														
○ UNCENSORED VALUE ⊕	AS P	0.4	_								0			_
	•													
		0 0												
TRENDS IN CONCENTRATION	CONCENTRATION,	0.3	_											
VALUES NVALUES NWYS SLOPE	πΩ .Σσ													
LOW FLOW 15 10 ND	SAMC (	0.2	-											-
HIGH FLOW 12 9 ND	25													
	<u> </u>	0.4												<b>⊕</b>
	Z	0.1	_						•	Φ.			4	. ^
		4					0	0 (	Ψ.	⊕ ○⊕		(	⊕ <del>(</del> 20	→ O
	(	0.0	76 77 7	8 79 8	30 81	82 8	33 84				89 9	0 91	<u> </u>	i.

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	<b>&gt;</b>	1,000	1× × × × × × × × × × × × × × × × × × ×	× × × × × × × × × × × × × × × × × × ×	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)	+ INT	100	×	* !	
SMOOTHED RELATION BETWEEN LOAD AND FLO (SHOWN IF THERE ARE 10 OR MORE VALUES)	DW 80	10	.×	1	-
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	LOA	1	 	1	-
		10	100 STREAMELOW	1,000 IN CUBIC FEET PER :	10,000 SECOND

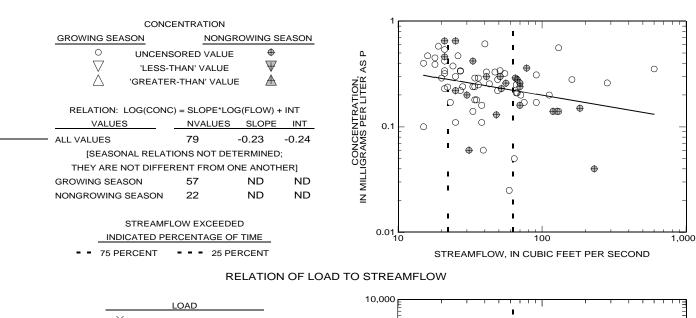
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				' '			' '			'		' '	'
LOW FLOW			HIGH FLOW												
1U O	NCENSORE	D VALUE	<b>+</b>	S P	2.0	L									_
ا' 🗸	_ESS-THAN	VALUE	$\overline{\Psi}$	⋖											
△ 'GR	EATER-THA	N' VALUE	■ 🛦	RATION,											
				Ę.	1.5	- 0									
TREN	DS IN CONC	ENTRAT	ION	돘삤											
VALUES	NVALUES	NWYS	SLOPE	CONCENTR							0				
LOW FLOW	8	7	ND	AM	1.0	_				_	0				_
HIGH FLOW	23	10	ND	S.S.					0	0					
				Ξ											
				N M I	0.5	F									<u>C</u>
				Z											
					1	•	<b>•</b>			<b>₽</b>	Ф		<b>+ +</b>	.⊕○	⊕
					0.0		8 79 80	01 02	02 0	9 <u> </u>	96 9	7 99		-	
						16 // /	0 /9 00	01 02	03 0	4 00	00 0	7 00	09 90	91	92 93

WATER YEAR

2.5

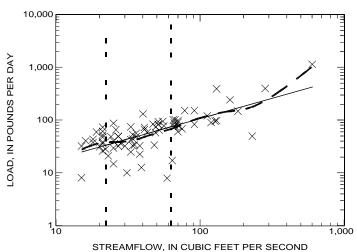
#### RELATION OF CONCENTRATION TO STREAMFLOW



	×							
	ON: LOG(LC	OAD) = SLOPE*LO	OG(FLOW)	+ INT INT				
ALL VALUES	s	79	0.77	0.49				
	L VALUES 79 0.77 0.4 MOOTHED RELATION BETWEEN LOAD AND FLOW HOWN IF THERE ARE 10 OR MORE VALUES)							

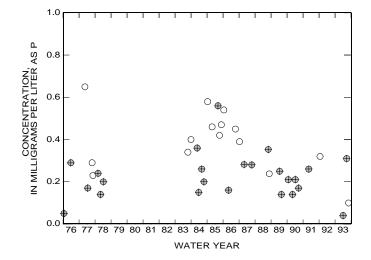
INDICATED PERCENTAGE OF TIME

- 75 PERCENT - - 25 PERCENT

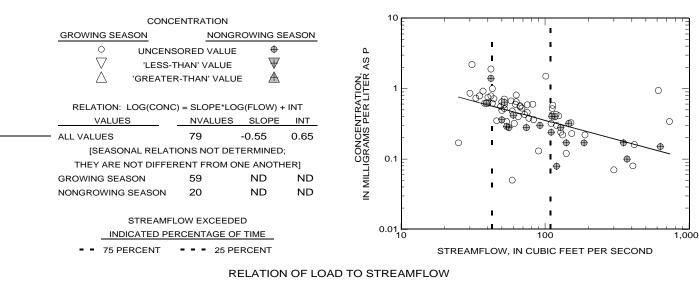


#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION							
LOW FLOW	HIGH FLOW						
Ο υ	NCENSORE	O VALUE	<b>⊕</b>				
$\nabla$	VALUE	$\overline{\Psi}$					
△ 'GF	REATER-THA	N' VALUE	■ 🛦				
TREN	IDS IN CONC	ENTRATI	ON				
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	15	8	ND				
HIGH FLOW	24	12	ND				



#### RELATION OF CONCENTRATION TO STREAMFLOW



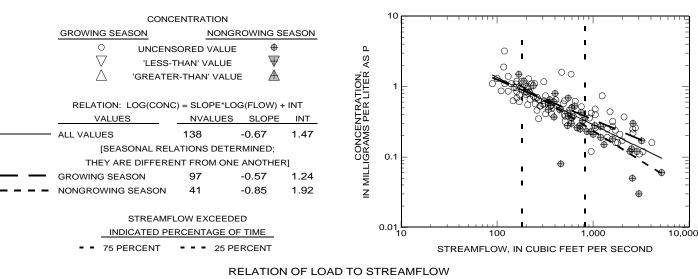
LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000	× -
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  SLOPE INT  ALL VALUES  79  0.45  1.39  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT  - 25 PERCENT	100 P P P P P P P P P P P P P P P P P P	1,000
	STREAMELOW IN CUBIC FEET PER SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		0
○ UNCENSORED VALUE   VLESS-THAN' VALUE	აგ გ 2.0 ₽	0-0
	RATION, ER LITER	5
VALUES NVALUES NWYS SLOPE	SPENT	
LOW FLOW 14 8 ND	ŽŽ 1.0	0
HIGH FLOW 28 11 ND	CONCE IGRAMS	
	■ N	5 -
	≥ <sub>0.5</sub> <u>Z</u>	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD		10,000	<del> </del>	1 1 1 1 1	<del>'''</del>	1 1 1 1	
×	UNCENSORED VALUE		Ė					=
$\nabla$	'LESS-THAN' VALUE	>	-		; ×>	$\langle \cdot \cdot \times \rangle$	×¥ ×	-
RELATION: LOG(I	_OAD) = SLOPE*LOG(FLOW) -	ے HINT کے	-		1	~,* × ×	××^_	1
VALUES	NVALUES SLOPE	HINT HINT	-	×			× ×	-
VALUES	138 0.33	2.21		×			« ^	
		Š	1,000	ĺ×.		<b>X</b> × ×		=
MOOTHED RELATIO	N BETWEEN LOAD AND FLO	w Q	F	₩.	<b>%</b> *****	IV	X	7
HOWN IF THERE A	RE 10 OR MORE VALUES)	Z	F	××>	<b>*</b> ^`\times	ı^	×	_
		AD,	-		1	1		-
STRE	AMFLOW EXCEEDED	Ŷ.	<u> </u>		1			-
INDICATE	D PERCENTAGE OF TIME	_	-		$\times$	1		-
75 PERCEN	NT 25 PERCENT				i	ı		
			100	100		1,000		10,000
				STREAMFLOW.	IN CLIDIC EE	ET DED 6	ECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

С	ONCENTRATION			5.0		1	1 1	- 1	1	1 1	ı	ı	-	1 1	ı	ı	
LOW FLOW		HIGH FLOW															
	CENSORED VALUE	<b>⊕</b>	AS P	4.0	-												-
Ň	ATER-THAN' VALUE	Å	RATION, R LITER		0												
TREND:	S IN CONCENTRATI	ON	RAT ER LI	3.0	- 0												_
	NVALUES NWYS	SLOPE	SENT PENT														
LOW FLOW	21 10	ND	CONCE	2.0	- 0												-
HIGH FLOW	40 13	ND	22		0									_			
			N MILL		0						0			0	(	) C	၁ မွ
			Z	1.0	_					o .	Φ	0	C	<i>y</i> O	Q	D 6	3 🖺
				4						•		. •	₽⊕ _d	_ _⊕##		Φ.	-
				00	ı 🖈 î	<b>*</b>	1 1			_ <b>⊕</b> _	ı 4	₽ı	$\oplus \oplus$	/ T 1999	# A	¦, ⊕	<b>99</b>

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

# APPENDIX 10. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL PHOSPHORUS 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CON	CENTRATION			1 F	<del> </del>	<del> </del>		
GROWING SEASON	NONGRO	OWING SE	ASON	F			I	
O UNCEN	SORED VALUE	<b></b>		_			I	
√ 'LESS	THAN' VALUE	$\overline{\Psi}$		AS -	<b>⊕</b>		I	
△ 'GREATE	R-THAN' VALUE	$\stackrel{\cdot}{\mathbb{A}}$		LITER				
				를 H		0		
RELATION: LOG(CON	C) = SLOPE*LOG	(FLOW) +	INT	Ä'R		•		
VALUES	NVALUES	SLOPE	INT	0.1	``	0 0 0	J	
ALL VALUES	62	0	ND	NA E		`		
[SEASONAL RE	ATIONS DETERM	MINED;		88		<b>`</b>		
THEY ARE DIFFERI	ENT FROM ONE A	ANOTHER	]	00	0	C⊕⊕⊕®Q		
GROWING SEASON	39	0	ND	<b> </b>	00	$\infty$ $\infty$ $\infty$	•	4
NONGROWING SEASON	23 -	0.41	-1	CONCENTRA CONCENTRA IN MILLIGRAMS PER	$\nabla$	OCORD ADAM	À.,	
STREAM	LOW EXCEEDED	)					1 /	
INDICATED PI	RCENTAGE OF	TIME		0.01	1	<u> </u>	100	
75 PERCENT	25 PER	RCENT			STREAM	FLOW, IN CUBIC FEET	Γ PER SEC	ONE
75 PERCENT	25 PER	RCENT			STREAMI	FLOW, IN CUBIC FEET	FPER SEC	ЛC

$egin{array}{ccc} & & & & & & & \\  imes & & & & & & & \\  ilde{\mathbb{V}} & & & & & & & \\  ilde{\mathbb{V}} & & & & & & & \\  ilde{\mathbb{V}} & & & & & & \\  ilde{\mathbb{V}} & & & & & & \\  ilde{\mathbb{V}} & & & & & & \\  ilde{\mathbb{V}} & & & & & \\  ilde{\mathbb{V}} & & & & & \\  ilde{\mathbb{V}} & & & & & \\  ilde{\mathbb{V}} & & & & & \\  ilde{\mathbb{V}} & & & & & \\  ilde{\mathbb{V}} & & & & \\  ilde{\mathbb{V}} & & & & \\  ilde{\mathbb{V}} & & & & \\  ilde{\mathbb{V}} & & & & \\  ilde{\mathbb{V}} & & & & \\  ilde{\mathbb{V}} & & \\  ilde{\mathbb{V}} & & & \\  ilde{\mathbb{V}} & & & \\  ilde{\mathbb{V}} & & \\  ilde{\mathbb{V}} & & & \\  ilde{\mathbb{V}} & & & \\  ilde{\mathbb{V}} & & \\  ilde{\mathbb{V}} & & & \\  ilde{\mathbb{V}} & & & \\  ilde{\mathbb{V}} & $	> 4	100			· · · · · · · · · · · · · · · · · · ·	×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW  VALUES  NVALUES SLOPE  ALL VALUES 62 0.87	V) + INT		×	×××××××××××××××××××××××××××××××××××××××	× V	
SMOOTHED RELATION BETWEEN LOAD AND FL (SHOWN IF THERE ARE 10 OR MORE VALUES)	LOW a	-		× ×	1	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT		0.01	× \	×	1 1	
		0.1	1 STRFAME	10 FLOW IN CUBIC F	100 FEET PER SECO	1,000 DND

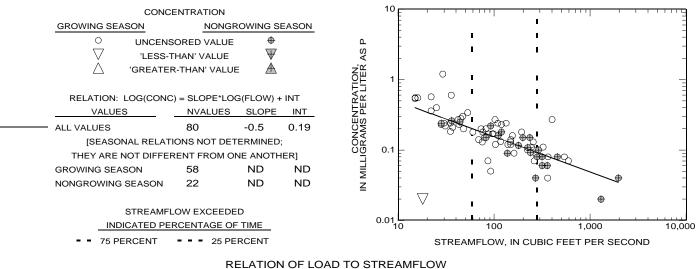
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
O UNCENSORED VALUE ⊕  ✓ 'LESS-THAN' VALUE ₩  △ 'GREATER-THAN' VALUE ♣	CONCENTRATION, IGRAMS PER LITER AS P	-
TRENDS IN CONCENTRATION	E0.03	⊕
VALUES NVALUES NWYS SLOPE	눌	
	MS MS	
LOW FLOW 0 0 ND	Z₹ 0.02	2
HIGH FLOW 3 3 ND	<u>0</u>	
	0.01 N N	
	0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

0.05

#### RELATION OF CONCENTRATION TO STREAMFLOW



$\frac{}{\mathbb{V}}$	LOAD UNCENSORED V 'LESS-THAN' VA			γAΥ	1,000	X		' × ' · · · · · · · · · · · · · · · · ·	×	T T T T T T T T T T T T T T T T T T T
RELATION: LOG(I	_OAD) = SLOPE*LO	G(FLOW)	+ INT	ж П	100	×、			×	
VALUES	NVALUES	SLOPE	INT	8		× ×		( îx		=
ALL VALUES	80	0.5	0.92	NDS	Ē	×/	***^^^ . ×	×		=
— SMOOTHED RELATIO	N BETWEEN LOAD	O AND FLO	ow.	Pol	-	•	' ×	ī		-
(SHOWN IF THERE AF	RE 10 OR MORE V	ALUES)		Ž Ć	10			Ī		
STRE	AMFLOW EXCEED	ED		LOA	Ē		) ]	I		=
INDICATE	D PERCENTAGE C	OF TIME		_	-			ı		-
75 PERCEN	IT = = = 25 P	ERCENT			-	abla	ı	1		-
					10		100	1,000	)	10,000
						STREA	MFLOW, IN	N CUBIC FEET PE	R SECO	ND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION					' '
LOW FLOW HIGH FLOW					
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ▲	ION, TER AS P				_
	L RA 1.5	_			_
TRENDS IN CONCENTRATION	Ë				
VALUES NVALUES NWYS SLOPE	<u> </u>	0			
LOW FLOW 24 11 ND	U≥ Z  1.0	_			_
HIGH FLOW 13 10 ND	CONCE GRAMS 0.1				
	□ ■ 0.5	0 0	_	0	
	≥ 0.5	- 0	0	O	_ 0
	<b>∠</b>	0	♥ 0°0 ® 8	8 0	0
		Ф. ф. ф	⊕⊕	. <del>•</del> . • • •	. ф

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

2.5

# APPENDIX 10. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL PHOSPHORUS 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION				1 F			1 1 1		1 1	<del></del>
GROWING SEASON	NONG	ROWING SEA	ASON		F			ı			=
'LESS-T	ORED VALUE THAN' VALUE R-THAN' VALU	$\forall$		FION, ITER AS P				1	0		- - -
RELATION: LOG(CONC	) = SLOPE*LO	G(FLOW) + I	NT	RA R L		0 0	10	Qi O	0		
VALUES	NVALUES	SLOPE	INT	눌	0.1 —	A B		⊕ <u>⊕</u> ⊗⊕।	0		_
ALL VALUES	94	0	ND	CONCENTR IN MILLIGRAMS PER	Ē	0 0			0	$\oplus$	=
[SEASONAL RELAT	IONS NOT DE	TERMINED;		Q.X.	Į.	0	O + O	<del>000</del> 00 (	DO O ∌⊕		-
THEY ARE NOT DIFFER	RENT FROM C	NE ANOTHE	R]		¢		0, 00	○ <del>○ ●</del> ● ●			-
GROWING SEASON	65	ND	ND	<u> </u>	+	0	Ø	<b>+</b>			-
NONGROWING SEASON	29	ND	ND	Z	-		•	1			_
	OW EXCEEDI				0.01		I LLL		1		
INDICATED PE	RCENTAGE O	- TIME			10		100		1,000	)	10,00
■ ■ 75 PERCENT		ELATION					MFLOW,	IN CUBIC F	EET PEI	R SECO	ND

#### RELATION OF LOAD TO STREAMFLOW

		LOAD UNCENSORED V	ΔI LIE			10,000			
	$\bigvee$	'LESS-THAN' VA			DAY	1,000	1	I I ×	-
	RELATION: LOG(L	OAD) = SLOPE*LC	G(FLOW)	+ INT	R	,,,,,,	Ī	×	× 1
	VALUES	NVALUES	SLOPE	INT	PE	-		× ×/×	
	ALL VALUES	94	0.98	-0.38	DS	-	<del>-</del>		=
- —	SMOOTHED RELATION			W	O, IN POUNDS	100	ı×		
		AMFLOW EXCEED D PERCENTAGE C T 25 P			LOAE	10	X X X I I I I I I I I I I I I I I I I I	I I I 1,00	00 10,000
						10		I,UI IN CUBIC FEET PI	

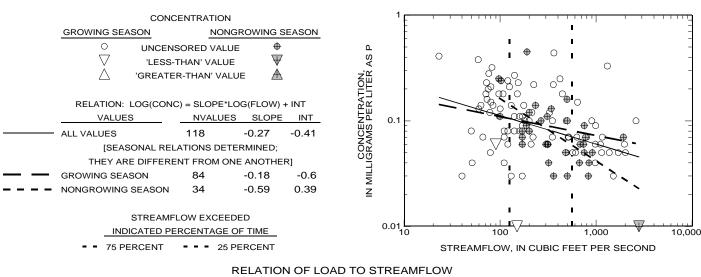
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
	NCENSORE LESS-THAN'		$\overline{\Psi}$
	REATER-THA		_
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	25	7	ND
HIGH FLOW	19	6	ND

0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



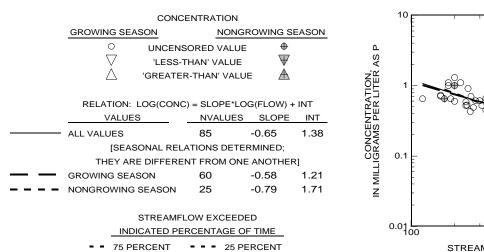
LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  118  0.73  0.33	「
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z  Q  Y	X X X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	10 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

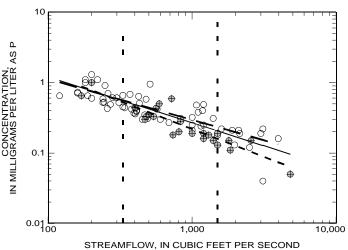
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		0.5	
O UNCENSORED VALUE  'LESS-THAN' VALUE  'GREATER-THAN' VALUE	FLOW	0.4	_
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOP	TTRAT	0.3	• o
LOW FLOW 34 10	CONCE DAME	0.2	8 0 0
	MILL N	0.1	
		0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

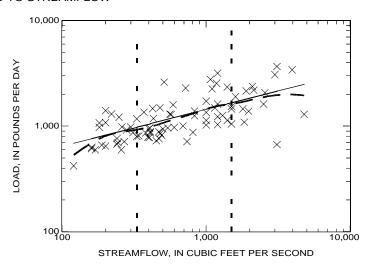
#### RELATION OF CONCENTRATION TO STREAMFLOW





#### **RELATION OF LOAD TO STREAMFLOW**

-		LOAD NCENSORED V LESS-THAN' V		
RELATIC	N: LOG(LOA	(D) = SLOPE*L	OG(FLOW)	+ INT
VAL	UES	NVALUES	SLOPE	INT
 ALL VALUES	3	85	0.35	2.11
 00025		BETWEEN LOA 10 OR MORE V	2712.20	W
1		FLOW EXCEED		
75	PERCENT	25 F	PERCENT	

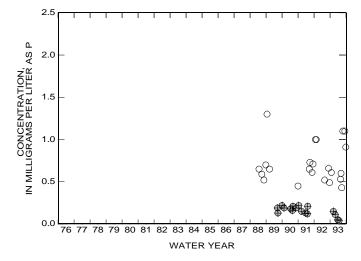


### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

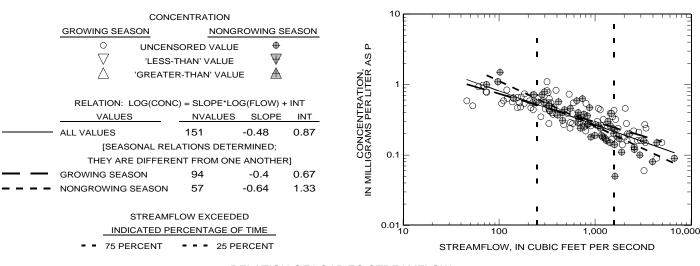
	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	O VALUE	<b>⊕</b>
$\triangle$	LESS-THAN	VALUE	$\overline{\Psi}$
△ 'G	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	22	6	ND

ND

HIGH FLOW



#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

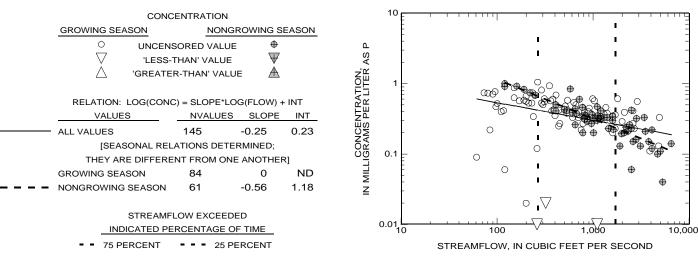
LOAD	10,000
imes UNCENSORED VALUE $ imes$ 'LESS-THAN' VALUE	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	PER C
ALL VALUES 151 0.52 1.6	9 1,000 - X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	× × × ·
STREAMFLOW EXCEEDED	LOAb,
INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	× 1
	100 100 1,000 1
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	۷.,	٦٢		- 1	- 1			-	- 1	- 1	- 1	-	-	- 1				
LOW FLOW  UNCENSORED VALUE  VIESS-THAN' VALUE	<	0 -	-															
TRENDS IN CONCENTRATION	PER	5 -					0	ı										
LOW FLOW 32 12 ND 22 HIGH FLOW 32 13 ND	LIGR	0 -	-				0 0	0	0		0		0		0			0
	<u>≥</u> 0.	5 -	-			0	ک ر ک	) ⊕	•	0			.4		8)	<b>+</b>	( (	○ ● •

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         145         0.75         0.96	0 H H 1,000 H H H H H H H H H H H H H H H H H H
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	7 100 × 1 = 1
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	Y X X X X X X X X X X X X X X X X X X X
	STREAMFLOW, IN CUBIC FEET PER SECOND

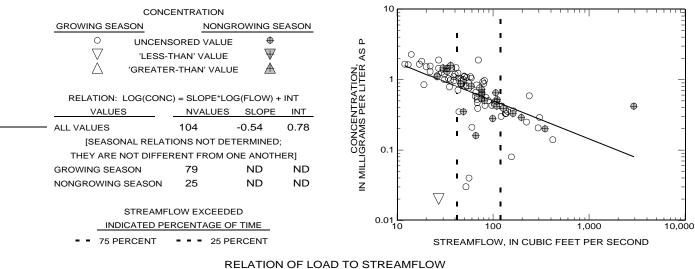
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION						
LOW FLOW	IGH FLOW					
○ UNCENSORED VALUE  □ 'LESS-THAN' VALUE □ 'GREATER-THAN' VALUE	TER AS P	0 —				_
	FA 1.	.5 –				_
TRENDS IN CONCENTRATION	N FP					
VALUES NVALUES NWYS S	SLOPE U Ø					
LOW FLOW 32 12	ND ND ND ND ND ND ND ND ND ND ND ND ND N	.0 –	0		0	_
HIGH FLOW 32 12	ND SE					
	=			0	0	
	W WILL O	.5 —	8 €000	0	<b>⊕</b>	
	Z			<b>#</b>	0	•
			8 4	<b>⊕</b>	<b>+ +</b>	• •
		J.	. ∦. <del>¥\$7. ,▼</del>			. 0. 0. 0

76 77 78<sup>V</sup>79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

2.5

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD				10,000	<del>-                                    </del>	πη.	<del> </del>		
$\stackrel{ imes}{ riangledown}$	UNCENSORED VA			<u>}</u>	- - -	I I	! !			
RELATION: LOG(L VALUES	.OAD) = SLOPE*LO NVALUES	G(FLOW) SLOPE	+ INT INT	PER DA	1,000	I V. XXXX	×	X		-
ALL VALUES	104	0.46	1.51	JNDS	100		XX	*		
- SMOOTHED RELATIO			W	POL	Ē	^ <b>^</b> ×	×			
(SHOWN IF THERE AF	RE 10 OR MORE VA	LUES)		∠ Q		1 🗸	I I			
STRE	AMFLOW EXCEEDE	ΕD		LOA	10	¦×	-			
INDICATE	D PERCENTAGE O	F TIME			E		1			
<ul><li>75 PERCEN</li></ul>	T = = = 25 PE	RCENT			-	V 1	I			
					10		100	1,0	00	10,0
						STREAM	FLOW, IN	CUBIC FEET P	ER SECOND	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION				' '		. '			'	'	' '	' '		' '
LOW FLOW HIGH FLOW						)								
○ UNCENSORED VALUE	AS P	2.0	_											_
abla 'LESS-THAN' VALUE $ abla$				0	0	)								
$ riangle$ 'GREATER-THAN' VALUE $ extcal{A}$	ΘË				0	6	_							
	Ε'n	1.5	_		Ü	8	0		~	00				_
TRENDS IN CONCENTRATION	꿃				0	0 (	_	(	<b>X</b>	~	0			
VALUES NVALUES NWYS SLOPE	CONCENTRATION, IGRAMS PER LITER			00	0	0 (	0							
LOW FLOW 31 14 0	NA NA	1.0	_	00	ŏ		0		$\infty$					_
HIGH FLOW 19 12 0	000						Ü						0	O
													0	
	IN MILL	0.5	_		0									_
	Z	4	4	<del>***</del>	<b>⊕</b>	4	→ ⊕	<b>#</b>				$\oplus \oplus \oplus$		<b>⊕</b>
		Ì	<i>P</i>	$\oplus$	<b>⊕</b>		Ψ.	<b>⊕</b>		$\oplus$		Ψ		
		0.0	70	77.70	ننب	04 00		0.4	05 0	0.07		20.00	$\sqrt{2}$	<del>-</del>
			76	// /8	79 80	81 82	83	84 8	85 8	6 87	88	39 90	91 9	2 93

WATER YEAR

2.5

#### RELATION OF CONCENTRATION TO STREAMFLOW

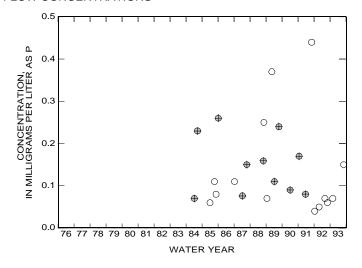
CONCI	ENTRATION				<sup>1</sup> F	1 1 1 1 1 1 1 1 1 1 1 1		
GROWING SEASON	NONG	ROWING SI	EASON		F	0	1	=
LESS-T	ORED VALUE "HAN" VALUE R-THAN" VALU	$\overline{\Psi}$		ON, TER AS P		⊖. ∞	1 0 0	0
RELATION: LOG(CONC	) = SLOPE*LO NVALUES		· INT	CONCENTRATI IGRAMS PER LI	0.1			_
ALL VALUES	57	0	ND	MCE SCE	Ė		_	=
[SEASONAL RELATI	ONS NOT DE	TERMINED	;	A A	t			=
THEY ARE NOT DIFFER	RENT FROM (	ONE ANOTH	IER]	09	F	0 .0		-
GROWING SEASON	45	ND	ND	MILLI	-	•	•	-
NONGROWING SEASON	12	ND	ND	Z	-	<b>+</b> 0	1	-
STREAMFL INDICATED PEI	OW EXCEED				0.01	10	100	1,00
75 PERCENT	25 P	ERCENT		NAD TO C		STREAMFLOW, IN		ŕ

#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD				1,000		
$\stackrel{ imes}{ riangledown}$	UNCENSORED '			<b>≻</b>	100	1	1 1
RELATION: LOG(L	.OAD) = SLOPE*L	OG(FLOW)	+ INT	R D	100	1	
VALUES	NVALUES	SLOPE	INT	PE	F	××	i×x 🌠
— ALL VALUES	57	1.17	-0.44	SONDO	10	XXX	XX
 - SMOOTHED RELATIO	N BETWEEN LOA	D AND FLC	W	PO	Ē	× .×	1
(SHOWN IF THERE AF	RE 10 OR MORE V	ALUES)		Ď,	<u> </u>		!
STRE	AMFLOW EXCEE	DED		Ō.	1 =	× × ^	-
INDICATE	D PERCENTAGE	OF TIME		_	F	-	1
75 PERCEN	T 25 F	PERCENT			F	ı	1
					0.4		

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	14	7	ND
HIGH FLOW	11	7	ND



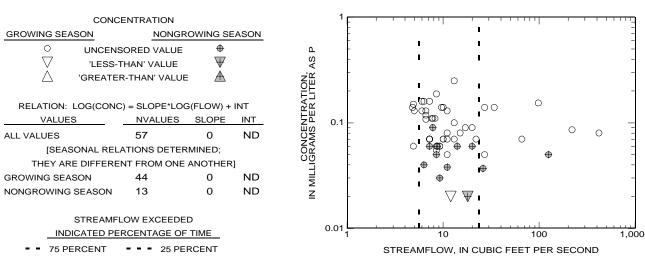
STREAMFLOW, IN CUBIC FEET PER SECOND

1,000

### APPENDIX 10. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL PHOSPHORUS 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

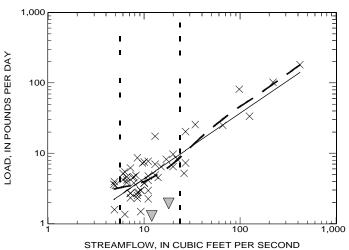
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



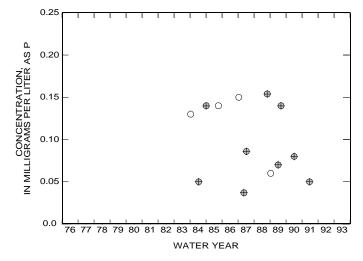
#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD			•	1,000	<del></del>
		CENSORED \ ESS-THAN' V			DAY		
RI	ELATION: LOG(LOAD	)) = SLOPE*L0	OG(FLOW)	+ INT	_	100	
	VALUES	NVALUES	SLOPE	INT	PER	100 =	
——— ALL V	/ALUES	57	0.93	-0.29	POUNDS		
smoo	OTHED RELATION BE	TWEEN LOA	D AND FLO	w	POL	-	
(SHO	WN IF THERE ARE 10	OR MORE V	ALUES)		Z	10	
	STREAMF	LOW EXCEED	DED		-OAD	Ė	;
	INDICATED PE	RCENTAGE (	OF TIME		_	-	3
-	- 75 PERCENT	25 F	PERCENT			F	,

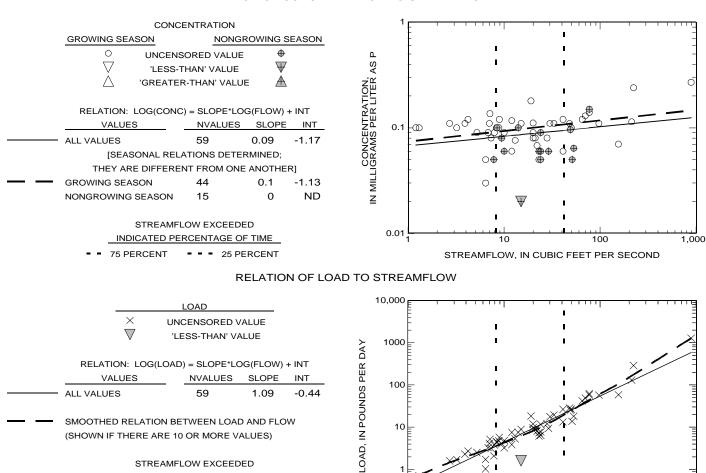


### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION							
LOW FLOW			HIGH FLOW				
Ο υ	NCENSORE	O VALUE	<b>⊕</b>				
▽ ,	$\overline{\Psi}$						
△ 'GF	REATER-THA	N' VALUE	<b>A</b>				
TREN	DS IN CONC	ENTRATI	ON				
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	4	4	ND				
HIGH FLOW	9	7	ND				



#### RELATION OF CONCENTRATION TO STREAMFLOW



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

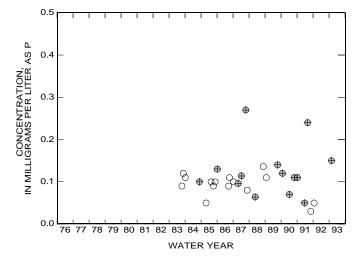
0.1

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>⊕</b>
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	15	9	ND
HIGH FLOW	14	8	ND

STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME

25 PERCENT

**75 PERCENT** 



STREAMFLOW, IN CUBIC FEET PER SECOND

1,000

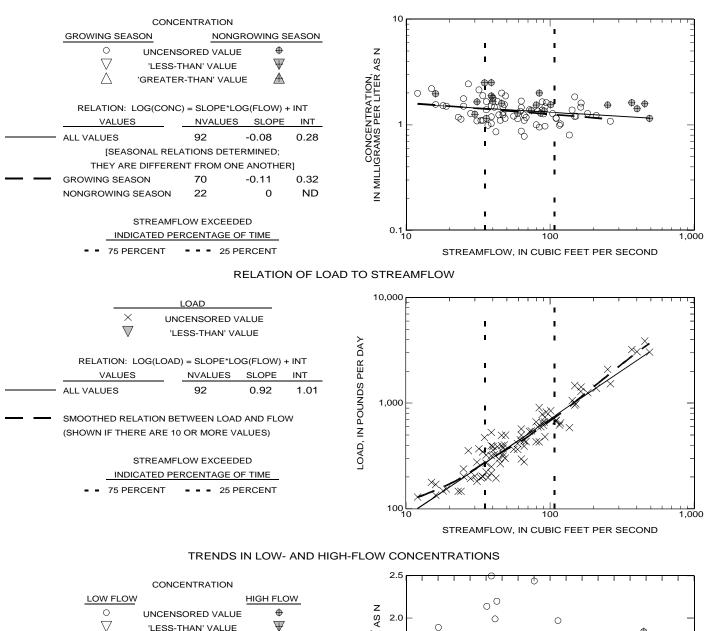
# Appendix 11 Total nitrogen

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

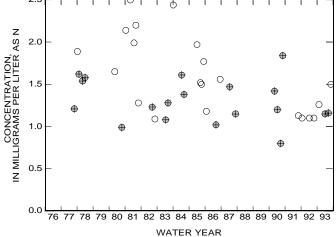


TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	21	10	ND			
HIGH FLOW	19	10	ND			

'GREATER-THAN' VALUE

 $\mathbb{A}$ 

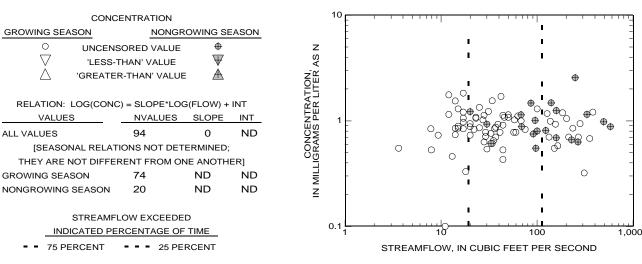
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# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES	A 1,000
ALL VALUES 94 1.03 0.61      SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	SON TOOL TOOL TO THE TOTAL TO T
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	TOAD. 10 X X Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y
	1 10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			
LOW FLOW	HIGH FLOW		
○ UNCENSORED VALUE  VESS-THAN' VALUE  OGREATER-THAN' VALUE	¥ *	Z 4.0 - ER 48 1.0 -	0
	Z.	⊒ 2.0	0
TRENDS IN CONCENTRAT	ION <u>E</u>	ji l	⊕
VALUES NVALUES NWYS	SLOPE W	S	$\Phi$
LOW FLOW 20 11	ND Z 0 0	∑ ₹ 2.0	0
HIGH FLOW 25 14	o	C)	0 0
		_	•
		⊒	
		Z Î	
		4	

0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

5.0

# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION		<sup>10</sup> E		1 1 1 1 1 1 1 1	<del></del>
GROWING SEASON	NONGROV	VING SEASON	ŧ			-
O UNCENS	ORED VALUE	<b>⊕</b>	z -			-
√ 'LESS-T	HAN' VALUE	$\Psi$	AS -			=
, ,	R-THAN' VALUE	À		8 ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	•	
<u> </u>			LITER		ŏ	
RELATION: LOG(CONC	) - SI ODE*I OC/E	LOWY - INT	٩	·		
VALUES	,	LOW) + INT	CONCENTR MILLIGRAMS PER	<b>I</b> €	<i>₽</i> 000 ⊕80 0⊕0	
-			2ω 1 <u>-</u>	1	Φ	
ALL VALUES	95 -0.	34 1.09	25	1 1		
[SEASONAL RELAT	ONS NOT DETER	MINED;	88			
THEY ARE NOT DIFFER	RENT FROM ONE	ANOTHER]				
GROWING SEASON	75 N	ND ND	╡			
NONGROWING SEASON	20 N	ND ND	Ž .			
			_			
STREAMFL	OW EXCEEDED					
INDICATED PE	RCENTAGE OF TI	ME_	0.1	100	1,000	10,
= 75 PERCENT	25 PERC	FNT		STREAMFLOW, IN CU	IBIC FEET PER SECO	OND

	AD ISORED VALUE -THAN' VALUE	100,000	1 1		
	VALUES SLOPE INT 95 0.66 1.82	10,000	1 1		
STREAMFLOV  INDICATED PERCI  - 75 PERCENT -	V EXCEEDED	1,000	100	1,000	10,000

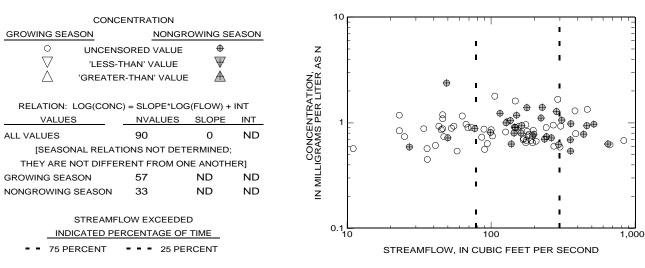
### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION				
LOW FLOW HIGH FLOW				
○ UNCENSORED VALUE	ION, TER AS N 8	3		_
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	CONCENTRATION, IGRAMS PER LITER 5 9	5—	-	) O
LOW FLOW 22 12 ND	ZŽ 4		0000000	
HIGH FLOW 22 13 0	CO LIGR		8 % 0	
	₩ 2 ¥	2 - +	⊕ ⊕ ⊕ ⊕ ⊕ ⊕	=
	=	\$ \$	⊕ ⊕ ⊕ ⊕ ⊕ ⊕	<b>⊕</b>

0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN
01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	1,000
ALL VALUES 90 1.01 0.64  — SMOOTHED RELATION BETWEEN LOAD AND FLOW	NOON NOON NOON NOON NOON NOON NOON NOO
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	100 P
75 PERCENT 25 PERCENT	10 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	
LOW FLOW HIGH FLOW	
O UNCENSORED VALUE	Σ
\times 'IESS-THAN' VALUE  \times 'GREATER-THAN' VALUE  \times A	TEN TEN TEN TEN TEN TEN TEN TEN TEN TEN
GREATER-THAN VALUE	는고
TRENDS IN CONCENTRATION	ΑΥ — — — — — — — — — — — — — — — — —
VALUES NVALUES NWYS SLOPE	
LOW FLOW 25 14 0	1.0 + + O O O O
HIGH FLOW 15 10 ND	
	WILL
	0.0
	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

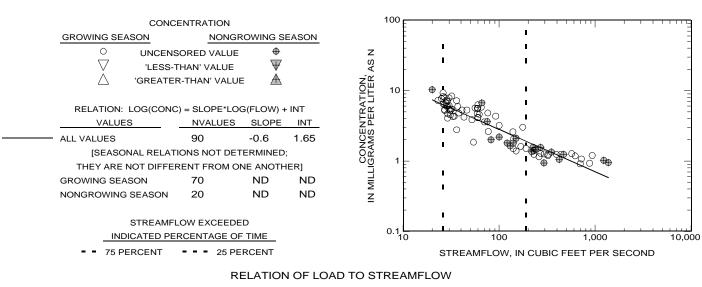
WATER YEAR

25-

### APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



X UNCENSORED VALUE			LOAD			1	0,000 F			<del></del>
VALUES NVALUES SLOPE INT  ALL VALUES 90 0.4 2.39  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  YOU INTERPORT OF THE PROPERTY OF THE PROPERT		$\overline{\mathbb{V}}$				<u>}</u>	-	:		
— SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z  Q		•	NVALUES	SLOPE	INT	_	-		×	-
Q <del>Q</del>						=	1,000	X		
STREAMELOW EXCEEDED	(SHOWN I	F THERE AI	RE 10 OR MORE VA	ALUES)		Ď. R	-	' <sup>*</sup> × ×	1	=
INDICATED PERCENTAGE OF TIME			AMFLOW EXCEED			LOA		I		-
75 PERCENT 25 PERCENT								ı	1	
100 L 100 1,000 10,00  STREAMFLOW, IN CUBIC FEET PER SECOND							100 L 10		ř	10,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		1 ' ' ' ' ' ' ' '		
LOW FLOW	HIGH FLOW			
○ UNCENSORED VALUE  ▽ 'LESS-THAN' VALUE  △ 'GREATER-THAN' VALUE	A SA SO SO SO SO SO SO SO SO SO SO SO SO SO			-
TRENDS IN CONCENTRATION VALUES NVALUES NWYS	ON HU NA SLOPE			
LOW FLOW 6 5 HIGH FLOW 25 11	IN MILLIGRAMS PER LITER  ON CONCENTRATION  10  21  21  22  24  25  26  27  27  28  29  20  20  20  20  20  20  20  20  20		0 0	0 -
			<b>* *</b>	⊕⊕● ⊕

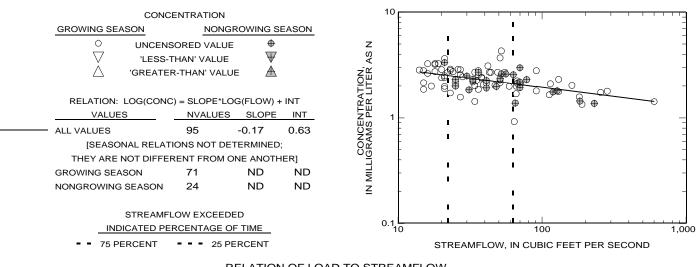
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

### APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	- I Y X/X/ X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	
	100 100 1,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	
LOW FLOW HIGH FLOW	_
○ UNCENSORED VALUE	Z Ø 4.0
√   'LESS-THAN' VALUE   √	
riangle 'GREATER-THAN' VALUE $ riangle$	2
	9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
TRENDS IN CONCENTRATION	FINAL OCTION OCT
VALUES NVALUES NWYS SLOPE	
LOW FLOW 20 11 ND	
HIGH FLOW 29 15 0	
	ī l
	₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩
	<u> </u>
	0.0
	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

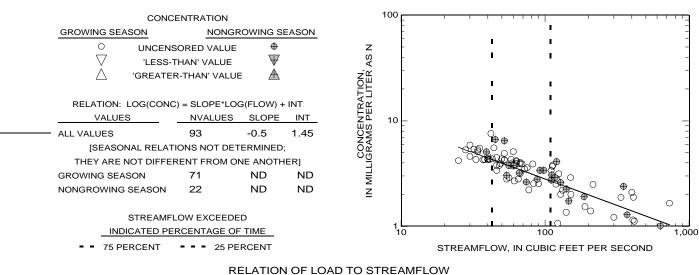
WATER YEAR

5.0

### APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD	10,000
× UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	× × × ×
	NT
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	Z
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	O
75 PERCENT 25 PERCENT	100 100 1,000
	310 100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

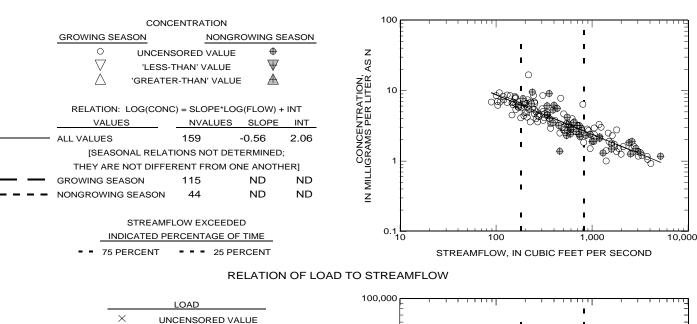
CONCENTRATION		1 .					1
LOW FLOW HIGH FLOW							
○ UNCENSORED VALUE	ION, TER AS N	8 –			0		_
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	CONCENTRATION GRAMS PER LITER	6 –	0	0 0	0		0
LOW FLOW 17 10 ND	Z ŽŽ	4 –	8	⊕ാ ത്	0 0		<u>0</u>
HIGH FLOW 33 14 0	88 88	•	<b>⊕</b>			Φ.	<b>•</b>
	N MILLE	<b>+</b>	⊕ ⊕ ⊕	•		<b>*</b> • •	
	Z	₩ •	<b>+</b>	Δ.	⊕ ⊕	<b>⊕</b>	<b>⊕</b>

0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

### APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



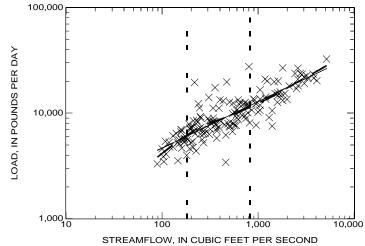
X UNCENSORED VALUE						
LESS-THAN' VALUE						
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT						
VALUES	NVALUES	SLOPE	INT			
LVALUES	150	0.44	2.70			

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
0	UNCENSORE	O VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
△ '(	GREATER-THA	'N' VALUE	$\blacksquare$
TRE	ENDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE

13

16

0

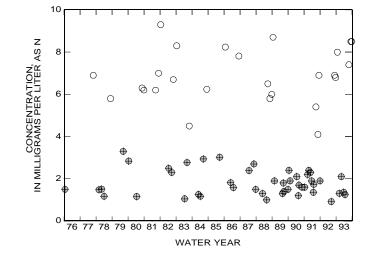
0

26

46

LOW FLOW

HIGH FLOW



# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCI	ENTRATION				10 F	<del></del>	<del></del>	<del> </del>		<del></del>
GROWING SEASON	NONG	ROWING S	EASON		ŧ				I	=
O UNCENS	ORED VALUE	• •		z	Į.				I	
$\overline{}$	'HAN' VALUE	$\overline{\Psi}$		AS	+			<b>⊕</b>	I	-
, ,	R-THAN' VALU	JE Å		TION,	+			<b>⊕</b>	1	-
RELATION: LOG(CONC	) = SLOPE*LC	OG(FLOW) +	· INT	∢-	Ī		0 (		1	
VALUES	NVALUES	SLOPE	INT	E.E.	1 —	0		o * • • • • • • • • • • • • • • • • • •	<b>•</b>	_
ALL VALUES	88	0	ND	CONCENTRA IGRAMS PER	Ī				₩	
[SEASONAL RELATI	ONS NOT DE	TERMINED	;	δĀ	Ė		<b>₽</b> ₩		₩.	⊕ ⊕-
THEY ARE NOT DIFFER	RENT FROM C	ONE ANOTH	HER]		Ţ	0				_
GROWING SEASON	53	ND	ND	<b> </b>	Ŧ			* · · •	•	-
NONGROWING SEASON	35	ND	ND	N M	_				ı	_
STREAMFL	OW EXCEED	ED							I . I	
INDICATED PE	RCENTAGE O	F TIME			0.1	0.1	1	10	100	1,000
75 PERCENT	25 P	ERCENT				STREA	MFLOW, IN C	UBIC FEET PE	ER SECON	1D
	_				D = 4 4 4 5	-1 -0 \ 4 \				

#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT  L	100
ALL VALUES 88 1 0.55 $\stackrel{\circ}{\Omega}$	10
SMOOTHED RELATION BETWEEN LOAD AND FLOW	
(SHOWN IF THERE ARE 10 OR MORE VALUES)	
STREAMFLOW EXCEEDED Q	
INDICATED PERCENTAGE OF TIME	0.1
75 PERCENT <b>= = 2</b> 5 PERCENT	
	0.01 0.1 1 10 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	RATION				•							. 1
LOW FLOW			HIGH FLOW	_									
O и	NCENSORE	D VALUE	<b>⊕</b>	Z Ø	2.0	_							
	LESS-THAN	VALUE	$\overline{\Psi}$	⋖									
△ 'GI	REATER-THA	AN' VALUE	■ ▲	ion, Ter									
				レコ	1.5	_							_
TREN	IDS IN CONC	CENTRAT	ION	FF									
VALUES	NVALUES	NWYS	SLOPE	SE									
LOW FLOW	0	0	ND	NA NA	1.0	_			<b>⊕</b>				_
HIGH FLOW	9	6	ND	CONCENTRA			$\oplus$	Ф	<b>⊕</b>				
				3				#					
				IN MILLI	0.5	_	$\oplus$		<b>⊕</b>				Φ_
				∠		<b>4</b>							
						•							
					0.0	76 77	78 70	80.81	82 83 84	85 86 87	88 89 90	91 92	2 93
						70 77	10 /8	00 61	02 03 04	05 00 67	00 09 90	91 92	. 33

WATER YEAR

# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRA	ATION	<sup>10</sup> F	1 1 1 1 1 1 1 1 1 1	<del></del>	т т т т т т
GROWING SEASON	NONGROWING SEASON	F	Φ.	I	=
○ UNCENSORED ○ 'LESS-THAN' ○ 'GREATER-THAN  RELATION: LOG(CONC) = SL	VALUE #	R LITER AS N		! ! ! ₩	- - - -
, , ,	ALUES SLOPE INT	Hall 1			
ALL VALUES 93 [SEASONAL RELATION THEY ARE DIFFERENT FR	S DETERMINED;	CONCENTR IN MILLIGRAMS PEF	1		- - - -
— GROWING SEASON 71	-0.4 1.06			1	-
<b>– – –</b> NONGROWING SEASON 22	-0.43 1.19	<u>Z</u> -	•	1	-
STREAMFLOW E  INDICATED PERCENT		0.1	100	1,000	10,000
75 PERCENT	25 PERCENT		STREAMFLOW, IN CU	IBIC FEET PER SECON	ID
	RELATION OF LOAI	D TO STREAM	MFLOW		

LOAD	10,000 × × × =
X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT	
ALL VALUES 93 0.62 1.77 $\stackrel{\circ}{\Omega}$	1,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z	
STREAMFLOW EXCEEDED OF TIME	
75 PERCENT 25 PERCENT	100 100 1,000 10,000
	100 1,000 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION										
LOW FLOW		HIGH FLOW									
Ο υ	NCENSORED VALU	E ⊕	Z	3							
▽ ,	LESS-THAN' VALUE	$\forall$	⋖	<b>^</b>							
△ 'GF	REATER-THAN' VAL	UE Å	N N N N N N N N N N N N N N N N N N N								
			F- 6	3		0					
TREN	DS IN CONCENTRA	TION	H.R.	1							
VALUES	NVALUES NWYS	SLOPE	ПΩ ∑С		C	)	_				
LOW FLOW	33 15	0	CONCENTRATION, IGRAMS PER LITER P 9	1 _			O		0		0 9
HIGH FLOW	15 10	ND	00.5		0	000	0	0	0	0	
					0	0 0	0	8 .			
			₩ 2 ₩ 2	_		0 0	000	0.	0 0		
			<u>z</u>			0		<b>⊕</b>	<b>.</b>		0
				<b>⊕</b>	$\oplus^{\oplus}$	Ф	₩ ⊕	<b>⊕</b>	* ⊕ €	₽₩	<b>⊕</b>
				1		Ψ	•				

0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION			<sup>10</sup> F		<del></del>
GROWING SEASON	NONG	ROWING SE	ASON	ŧ	ı	=
CONTRACTOR (CONTRACTOR)  CONTRACTOR (CONTRACTOR)  CONTRACTOR (CONTRACTOR)	NVALUES	DG(FLOW) + I	INT	ENTRATION, S PER LITER AS N		- - - -
ALL VALUES 94 0 ND  [SEASONAL RELATIONS NOT DETERMINED;  THEY ARE NOT DIFFERENT FROM ONE ANOTHER]				CONCE	٥	-
GROWING SEASON NONGROWING SEASON	65 29	ND ND	ND ND	IN WILL	;	-
STREAMF INDICATED PE	LOW EXCEED			0.1	100 1,000	10,00
75 PERCENT	25 PI	ERCENT			STREAMFLOW, IN CUBIC FEET PER SE	COND

#### RELATION OF LOAD TO STREAMFLOW

LOAD	100,000
× UNCENSORED VALUE  VLESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  94  1.02  0.77	1,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100 × 100 1,000 10,000
	'10 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

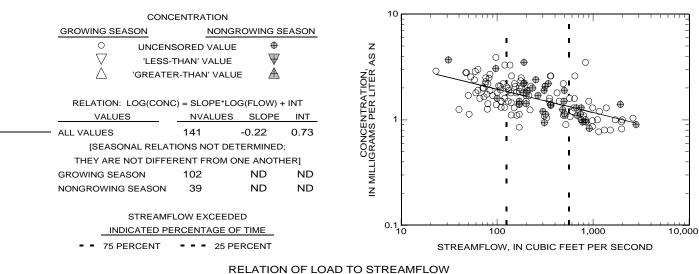
CONCENTRATION  LOW FLOW HIGH FLOW  UNCENSORED VALUE  'LESS-THAN' VALUE  'GREATER-THAN' VALUE  TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	ENTRATION, S PER LITER AS N	2.5	
LOW FLOW 25 7 ND HIGH FLOW 19 6 ND	CONCENTRAIN MILLIGRAMS PER	1.0	
	<u>Z</u>	0.5	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	100,000
	10,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000 - 1
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	100 10 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

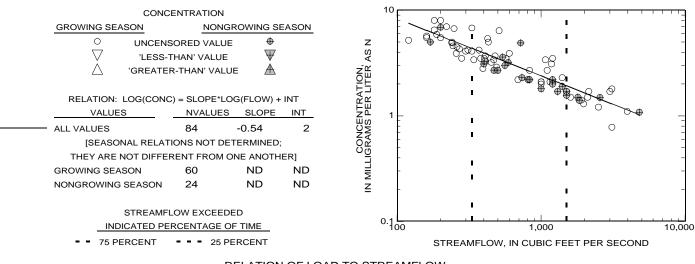
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		0.0	
LOW FLOW HIGH FLOW	_		
○ UNCENSORED VALUE	A N N	4.0	_
√ 'LESS-THAN' VALUE Ψ	-,γ. Α		0
	ΘË		•
	¥X □	3.0	_
TRENDS IN CONCENTRATION	NTRA		
VALUES NVALUES NWYS SLOPE	Ä.S		
LOW FLOW 44 13 ND	ΝÃΑ	2.0	
HIGH FLOW 34 12 ND	00		l g & d
	CONCE IN MILLIGRAMS		
	Ξ	1.0	
	≥		<b>⊕</b> ⊕ ⊕ ⊕ ⊕ ⊕
		0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
			10 11 10 13 00 01 02 03 04 03 00 01 00 03 90 91 92 93

WATER YEAR

APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN
01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD		100,000			3
imes UNCENSORED VALUE VLESS-THAN' VALUE	>	- - -	1	I	-
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW VALUES NVALUES SLOPE	INT H	-	. × × ××	× × ×	_
ALL VALUES 84 0.46	2.73	10,000	X	<b>※</b>	_
SMOOTHED RELATION BETWEEN LOAD AND FL	ow 0			1	-
(SHOWN IF THERE ARE 10 OR MORE VALUES)	<u>=</u>	- <b>/</b> *	× .		-
STREAMFLOW EXCEEDED	LOA	l ×	i	•	-
INDICATED PERCENTAGE OF TIME		-			-
75 PERCENT 25 PERCENT			Ī	Ī	
		1,000	1,000	10,0	)00
		STI	REAMFLOW, IN CUBIC FE	EET PER SECOND	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE ♥  VLESS-THAN' VALUE	Z S 8 8 -	- 0
	ION, TER,	009
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	CONCENTRAT GRAMS PER LI 7	- %
LOW FLOW 23 6 ND	ON 4	
HIGH FLOW 17 4 ND	Ť l	0
	ИW 2- И	

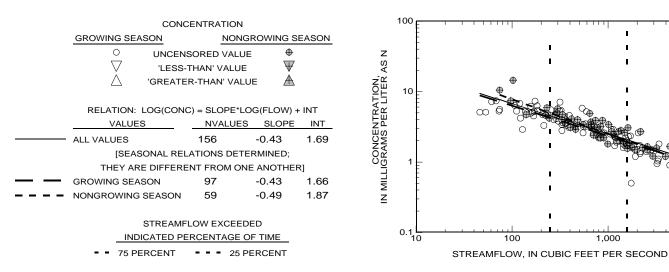
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

## APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

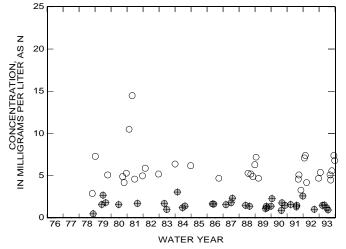


#### **RELATION OF LOAD TO STREAMFLOW**

LOAD		100,000	<del>-                                    </del>		
× UNCENSORED VALUE		F		1	
V 'LESS-THAN' VALUE	>	-		ı	·
RELATION: LOG(LOAD) = SLOPE*LOG(FLOV	) (V) + INT	۲. چ ا		I ,,	
VALUES NVALUES SLOPE		<u> </u>		ı	<b>***</b> ^ -
ALL VALUES 156 0.57	2.42	2		× ***	<b>6</b> ××
	2	10,000			_
SMOOTHED RELATION BETWEEN LOAD AND F	LOW	2 -	×		_ =
(SHOWN IF THERE ARE 10 OR MORE VALUES)	3	<b></b>		<b>**</b> ******	× -
	2	j	×	$\times_{\mathbf{I}}$	-
STREAMFLOW EXCEEDED	Č	<b>}</b>		I	-
INDICATED PERCENTAGE OF TIME	_	-	<i>1</i> × ×		-
75 PERCENT 25 PERCENT	Г		×	i	1
		1,000	100	1,000	10,000
			STREAMFLOW, IN	CUBIC FEET PER	SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION		
LOW FLOW			HIGH FLOW	
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$	
△ 'GF	REATER-THA	N' VALUE	■ ▲	
TREN	DS IN CONC	ENTRAT	ION	
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	34	13	0	
HIGH FLOW	35	14	0	

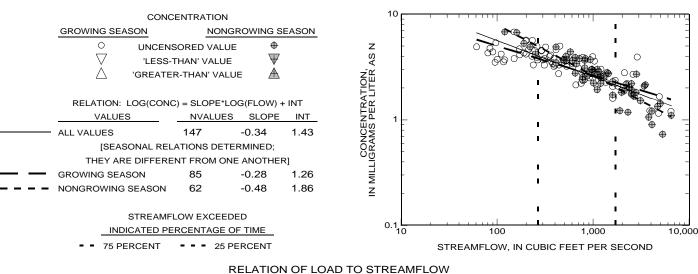


10,000

## APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	<b>&gt;</b>	100,000		: :	X	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) +  VALUES  NVALUES  SLOPE  ALL VALUES  147  0.66	INT	10,000 —			××	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	w N POU	10,000	× ×,			
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	LOAI	-		1	-	
		1,000	100 STREAMFLOW, II	1,000 N CUBIC FEET PER		Ю

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	١		10	- 1	ı	1 1	1 1	- 1	- 1	1 1	1	1 1	ı	
LOW FLOW	HIGH FLOW	_												
<ul> <li>UNCENSORED VAL</li> </ul>		Z 0	8 -	_										
LESS-THAN' VALU	JE Ā	₹ 7												
△ 'GREATER-THAN' VA	LUE A	ATION, LITER				0	0							
TRENDS IN CONCENTE	ATION	CONCENTRAT IN MILLIGRAMS PER L	6	_		8					0			
VALUES NVALUES NWY	'S SLOPE	SEN			0		8			95				
LOW FLOW 31 12	ND	AN	4	_	Sp.	00	0 0	0		0		Φ _		
HIGH FLOW 34 14	0	28			8	_	O		0			<b>♥</b> ⊗		
		⊒				$\oplus$			$\oplus$					
		Σ	2	*	<b>+ +</b>	<b>P P</b>	Φ ⊕	<b>⊕</b>	<b>⊕</b>		<b>⊕</b>		đ	
		=	6	•	⊕ 🗱			+	⊕ <sup>™</sup>				Ψ	•

10 -

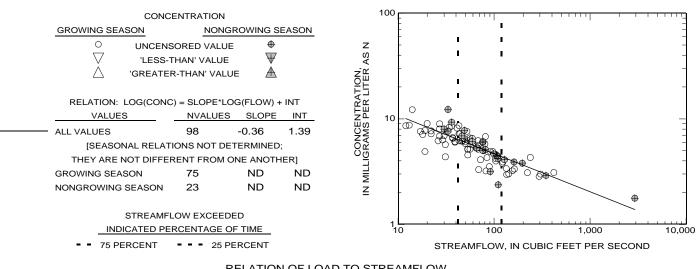
0 0

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  98  0.64  2.12	
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	100 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

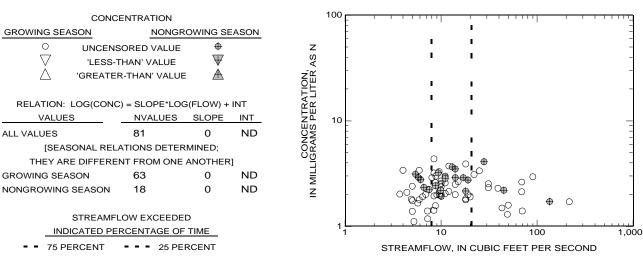
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE	Z の 20	
√ 'LESS-THAN' VALUE ₩	⋖	~
	O.H.	
	Ĕ5 15	5 –
TRENDS IN CONCENTRATION	75 I	3 <u> </u>
VALUES NVALUES NWYS SLOPE	CONCENTRATION, IGRAMS PER LITER, 01	0 0
LOW FLOW 29 13 ND	25 20 10	
HIGH FLOW 17 11 ND	Öğ 10	-
HIGH FLOW II II IND		
	⊒ ∑ Z	000000000000000000000000000000000000000
	≥ 5 Z	
	=	$\Phi$ $\Phi$ $\Phi$ $\Phi$ $\Phi$ $\Phi$
		⊕

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN
01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

	LOAD NCENSORED \ LESS-THAN' V			Α	10,000	1 1		×
RELATION: LOG(LOA VALUES	NVALUES	OG(FLOW) SLOPE	+ INT INT	PER D,	1,000	1		
ALL VALUES	81	0.98	1.12	JNDS	Ē	·	XXXX	]
- SMOOTHED RELATION E	BETWEEN LOA	D AND FLC	W	POI	-			-
(SHOWN IF THERE ARE	10 OR MORE V	ALUES)		Ž Ć	100		Ī	
STREAM	FLOW EXCEE	DED		-OAI	Ē		1	=
INDICATED F	ERCENTAGE (	OF TIME		_	-	^`&	ı	-
75 PERCENT	25 F	PERCENT			-	ı	ı	-
					10	10	100	1,000
						STREAMFLOW,	IN CUBIC FEET PER	SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

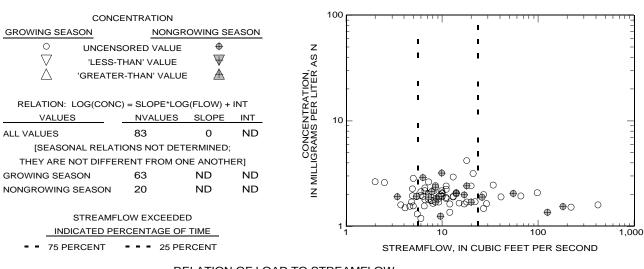
	CONCENTR	ATION			5.0						1	1 1	- 1	1			- 1	
LOW FLOW			HIGH FLOW	z														
	NCENSOREI LESS-THAN'		₩	A AS	4.0	_				4	→							_
△ 'GF	REATER-THA	N' VALUE	■ ▲	SE SE SE SE SE SE SE SE SE SE SE SE SE S				Œ	D		<b>#</b>	+						
TREN	IDS IN CONC	ENTRAT	ION	CONCENTRATION. GRAMS PER LITER	3.0	_		<b>⊕</b>	0					⊕	<b>○</b>		(	_
VALUES	NVALUES	NWYS	SLOPE	NEN.				<b>⊕</b>		0	<b>⊕</b>	0	,			4	Φ	00
LOW FLOW	21	10	ND	ONG	2.0	-		<b>⊕</b> <sup>©</sup>	9	<b>b</b>		Õ	. 0	<b>⊕</b>	0		•	Ŭ -
HIGH FLOW	16	11	ND					₩,	´			0	. 0		<del>О</del> Ф		0	0
				W N	1.0	_									0	<b>⊕</b>		<u>C</u>
				₹														
					0.0													
						16 /	78	79 80	81	82 8	3 84	85	გი გ	37 88	889	90	91 9	12 93

WATER YEAR

# APPENDIX 11. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITROGEN 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

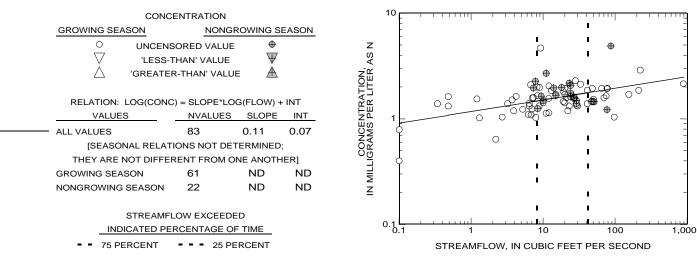
LOAD	10,000
× UNCENSORED VALUE	
V 'LESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	<u></u>
VALUES NVALUES SLOPE INT	1,000
ALL VALUES 83 0.97 1.06	
— SMOOTHED RELATION BETWEEN LOAD AND FLOW	~
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Z 100 -
STREAMFLOW EXCEEDED (	5   <b>***</b>
INDICATED PERCENTAGE OF TIME	
75 PERCENT 25 PERCENT	
	10 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW	_	
○ UNCENSORED VALUE ⊕	Ζ ග 4.0 ◀	
√ 'LESS-THAN' VALUE  √		
riangle 'GREATER-THAN' VALUE $ riangle$	SH SH	
	₩ 3.0	_
TRENDS IN CONCENTRATION	ÄÄ	O
VALUES NVALUES NWYS SLOPE	CONCENTRATION. 10 CONCENTRATION. 10 CONCENTRATION. 10 CONCENTRATION. 10 CONCENTRATION. 10 CONCENTRATION.	Φ
LOW FLOW 14 9 ND	ZZ 2.0	
HIGH FLOW 13 11 ND	98	
	∃	
	I.0	-
	₹	
	0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
		10 11 10 19 00 01 02 03 04 03 00 01 00 09 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

$\overline{\hspace{1cm}}^{\times}$	LOAD UNCENSORED V			>	100,000	<del> </del>		1 1	
RELATION: LOC VALUES - ALL VALUES	G(LOAD) = SLOPE*LC NVALUES 83	SLOPE 1.11	+ INT INT 0.8	JUNDS PER DA	1000			, ×	111
 (SHOWN IF THERE	ION BETWEEN LOAI ARE 10 OR MORE V	ALUES)	ow.	AD, IN PC	10	XXXXX		1 1 1	- - - - - -
	REAMFLOW EXCEED FED PERCENTAGE C ENT 25 P			ΓO	0.1	1	 	1 1 100	1,000
						STREAMF	LOW, IN CUBIC	FEET PER SEC	COND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		0.0	
LOW FLOW HIGH FLOW	_		
○ UNCENSORED VALUE ⊕	AS N	4.0	_
∵ 'LESS-THAN' VALUE ₩			
$ riangle$ 'GREATER-THAN' VALUE $ extcal{A}$	ION, TER		
	Ϋ́	3.0	
TRENDS IN CONCENTRATION	CONCENTRAIN MILLIGRAMS PER		Ψ
VALUES NVALUES NWYS SLOPE	13 13 13		0 *
LOW FLOW 26 13 ND	ΣŠ	2.0	
HIGH FLOW 17 10 ND	9 8 8		<b>#</b>
	∃		
	Σ	1.0	- ° ° ° ° ° d • ° − 1
	≥		0 0
			0
		0.0	
			76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

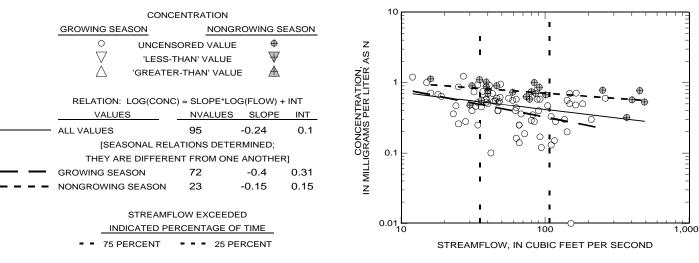
# Appendix 12 Total nitrate plus nitrite

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

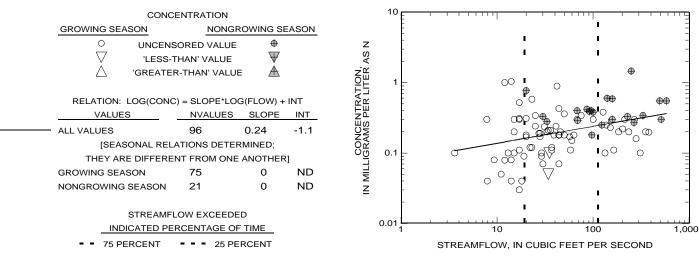
LOAD		10,000	1 1	· · · · · · · · · · · · · · · · · · ·	1 1 1	
X UNCENSORED VALUE		Ė	1			=
LESS-THAN' VALUE	>	-	ī	i		×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)  VALUES NVALUES SLOPE	INT G	1,000	I J,			
ALL VALUES 95 0.76	0.83 💆		××		$\stackrel{\longleftarrow}{\sim}$	-
SMOOTHED RELATION BETWEEN LOAD AND FLO (SHOWN IF THERE ARE 10 OR MORE VALUES)	DW WOUN	100		× × ·	Χ.	
STREAMFLOW EXCEEDED	OA	10	:	•	×	=
INDICATED PERCENTAGE OF TIME	_	Ė	•	ī		=
75 PERCENT 25 PERCENT		-	1	I		1
		10		100		1,000
			STREAMF	LOW, IN CUBIC	FEET PER SEC	DND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION				' '	' '	' '	1 1			' '	'	'
LOW FLOW	HIGH FLOW	_										
<ul> <li>UNCENSORED VALUE</li> </ul>	<b>+</b>	AS N	2.0	_								_
√ 'LESS-THAN' VALUE	$\overline{\Psi}$	- 1	2.0									
△ 'GREATER-THAN' VALU	E A	ΝË										
		₽5	1.5	_								
TRENDS IN CONCENTRAT	ION	ξÄ	0									
VALUES NVALUES NWYS	SLOPE	N N				0	0	_				
LOW FLOW 21 10	ND	CONCENTRATION, IGRAMS PER LITER	1.0	_		0		O				_
HIGH FLOW 20 10	ND	88 8		0		0 ~		0				
		Ä		•	Ð	0		8 9	)	<b>⊕</b>		
		N MILL	0.5	_			<b>+</b> ,	⊕	<b>⊕</b>	\$	~ 0	
		Z		<b>⊕</b>			0	0.	Ψ		0 (	ص کر
				Ψ		Φ (	Ψ ⊕	#	<b>,</b>	<b>⊕</b>	0	9
			0.0			₩			<del>()</del>			
			0.0	76 77 7	8 79	80 81	82 83 8	4 85 86	87 88	89 90	91 92	93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

					10,000 -				<del></del>
	LOAD				<b>F</b>			' <b>.</b>	
×	UNCENSORED V	ALUE			F			•	
$\nabla$	'LESS-THAN' VA	LUE					•	. ×	~
				Α̈́	1,000		•	• /`	×^
RELATION: LOG	(LOAD) = SLOPE*LC	G(FLOW)	+ INT	~	1,000		_	- >/	
VALUES	NVALUES	SLOPE	INT	PEF	F		1	'× 💉	×
- ALL VALUES	96	1.24	-0.37	DS F	Ē		' ×	<b>**</b>	
ALL VALUES	90	1.24	-0.37	Z	100		~		X
				20	100	×	× × × × ×	<b>*</b> × × ^ _	
 SMOOTHED RELATI	ON BETWEEN LOAD	AND FLC	ΟW	ď	-		_XLX <b>XX</b>	<u> </u>	
(SHOWN IF THERE A	ARE 10 OR MORE VA	ALUES)		Z	<u> </u>			× ,	
				Ó,		×	×**×		
STR	EAMFLOW EXCEED	ED		Ŏ.	10	^_	$\nearrow \nearrow$		
INDICAT	ED PERCENTAGE O	F TIME		_	Ē	$/\!\!\!/_{\!$	× •		
- 75 PERCE	NT 25 P	ERCENT			-	/ X	×× <u>`</u>	•	
701 2102	2011	_INOLINI			Ţ	* × ,			
					1 <u> </u>	10	<u> </u>	100	1
						STREAMFLOW	IN CUBIC FE	EET PER SECO	ND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

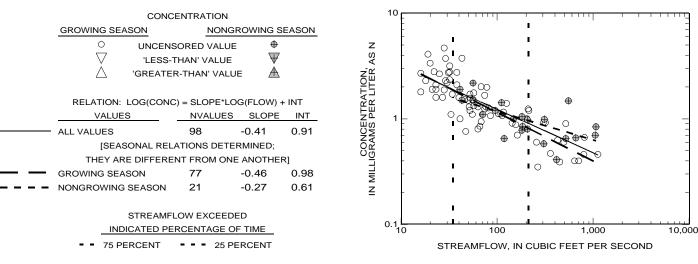
CONCENTRATION	I	2.0	' '	1 1 1	1 1	1 1 1	1 1 1 1	' ' '
LOW FLOW	HIGH FLOW	_						
UNCENSORED VAL	- 0		L					_
'LESS-THAN' VALU	E \$\frac{1}{2} \text{2}							
		_						
	ΑΑ Ε	1.5	H			<b>⊕</b>		_
TRENDS IN CONCENTR	ATION FL	_						
VALUES NVALUES NWY	S SLOPE UV	5						
LOW FLOW 21 12	ND Ž	1.0	-	0			0	_
HIGH FLOW 26 14	0 8	2						
	ATION HELD  S SLOPE  ND NV  O OO		4	• •	<b>⊕</b>		. •	
	2	0.5	[	Ψ	<b>.</b>		•	=
	_		Φ,	₽	* O (			<b>⊕</b>
		0.0	8		)	´, ♥ q	₽ 9 €	, , , ,
		5.0	76 77 7	8 79 80	81 82 83	84 85 8	6 87 88 89 90	91 92 93

WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE  >	10,000 × × ×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  98  0.59  1.64	
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	100 100 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

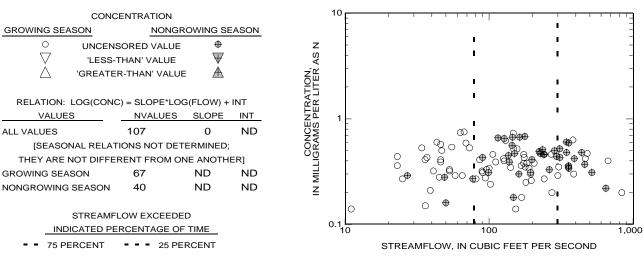
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		Ţ
	Z 20 4.0 4 4 11 1	0
TRENDS IN CONCENTRATION	7 7 7	0000
LOW FLOW 23 13 ND HIGH FLOW 23 13 0		-
	1.0 ·	

0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

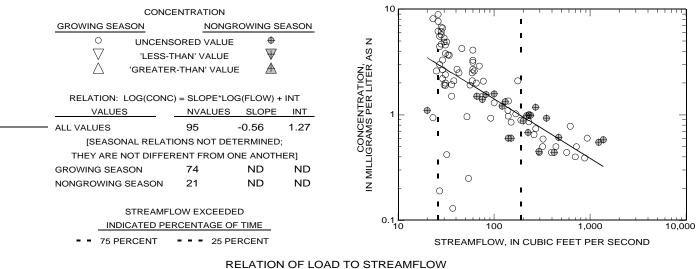
×	LOAD UNCENSORED VALUE 'LESS-THAN' VALUE		<b>&gt;</b>	10,000	1		
ALL VALUES  — SMOOTHED RELATION	DAD) = SLOPE*LOG(FLOW)  NVALUES SLOPE  107 1.06  BETWEEN LOAD AND FLOE  10 OR MORE VALUES)	0.19	IN POUNDS PER DAY	1,000		1	***
	MFLOW EXCEEDED PERCENTAGE OF TIME 25 PERCENT		LOAD	10	I I 100 STREAMFLOW, IN CUBIC	I I I FEET PER SECO	1,000 ND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			1.0		1	I	1 1	ı	ı	1	1	1 1	ı	ı	1	1	
LOW FLOW			HIGH FLOW	_															
). ,	NCENSOREI LESS-THAN' REATER-THA	VALUE	⊕ ₩ ± <b>A</b>	ION, TER AS N	0.8	_										0	C	)	-
TREN	DS IN CONC	ENTRAT	ION	NTRATION, PER LITER	0.6	_	0		Ф Ф		0		<b>⊕</b>	0	∌⊖		(	)	_
VALUES	NVALUES	NWYS	SLOPE	Äα Ng			_ ⊕		₩	Ф (	)		$\oplus$				,	,	
LOW FLOW	29	14	0	NA NA NA	0.4	_	O			0		8	₩(	O		$\oplus$			Φ-
HIGH FLOW	21	11	ND	CONCER	1	<b>₽</b> ⊕		0	00	(A)	<b>⊕</b>		8	Ψ				○ <del>•</del>	Φ
				N M F	0.2	_	<b>⊕</b>		<b>∞</b>	Ψ	<b>⊕</b>		0						_
				_	0.0			1			1		ı	1 1	1	1	1	ı	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	H 1,000
ALL VALUES 95 0.44 2  — SMOOTHED RELATION BETWEEN LOAD AND FLOW	O C C C C C C C C C C C C C C C C C C C
(SHOWN IF THERE ARE 10 OR MORE VALUES)	<u>z</u> 100 ×
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	ğ [
731 ENOEM 231 ENOEM	10,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

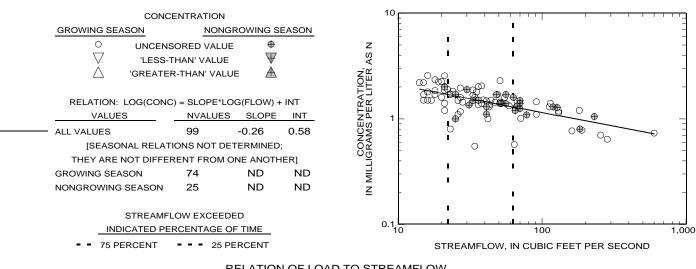
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		. •	'	ı		'	1		'				' '	'	'	1 1	1
LOW FLOW HIGH FLOW	_														(		
O UNCENSORED VALUE ♥  VILESS-THAN' VALUE ▼  OREATER-THAN' VALUE	ON, TER AS N	8	_								С	)				7	2
TRENDS IN CONCENTRATION	TRAT ER LI	6	_								(	С				-	-
VALUES NVALUES NWYS SLOPE	S E																
LOW FLOW 7 6 ND	AN	4	_													_	
HIGH FLOW 26 12 ND	OS GR																
	CONCENTRATION, IN MILLIGRAMS PER LITER	2						С	)							-	
	<b>4</b>	•	•			₽	<b>•</b>	₩.	<b>O</b>	8	<b>⊕</b>		<b>⊕</b>	<b>+</b>		•	٠
		0	76 7	7 78	79 8	0 81	82	83	84	85	86	87	88	89 9	91	92 93	3

WATER YEAR

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#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

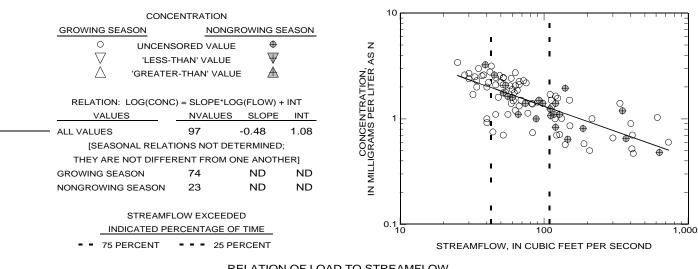
LOAD  X UNCENSORED VALUE		10,000	<del> </del>	1 1	1 1 1 1	
VLESS-THAN' VALUE	DAY	-	i			× ]
RELATION: $LOG(LOAD) = SLOPE*LOG(FLOW) + II$	NT 🖭	1,000	i	1	X	
VALUES NVALUES SLOPE I	PE TN	1,000	ī	V 1 X	× ^^	∃ .
ALL VALUES 99 0.74	1.31	F	-		`	1
— SMOOTHED RELATION BETWEEN LOAD AND FLOW	POU	F		ř		-
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Z Ć	100	× × ×	1		=
STREAMFLOW EXCEEDED	LOA	Ē	I I	I		=
INDICATED PERCENTAGE OF TIME	_	-		Ī		-
75 PERCENT 25 PERCENT		-	1	1		-
		10	<u> </u>	100		1,000
			STREAMFLO	W, IN CUBIC FEE	T PER SECOND	ı

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRA	NOITA			1 '		•			•					
LOW FLOW			HIGH FLOW												
, ,	NCENSORED LESS-THAN' REATER-THAI	VALUE		ION, TER AS N	4.0 —										_
				¥7 3	3.0 —										_
TREN	IDS IN CONCI	ENTRAT	ION	NTR/ PER							<b>O</b>				
VALUES	NVALUES	NWYS	SLOPE	SE				_		_ '	w 0				
LOW FLOW	21	11	ND	CONCEI GRAMS	2.0 —			0 0			) _	0		_	_
HIGH FLOW	29	15	0	00 08		$\circ$		°	0		O	O		0	
						<b>1</b>	<b>+</b>		00		<b></b> ⊕	Φ,	<b>⊕</b> ⊕		⊕
				⊒ W 1	1.0	0	•	f		⊕⊕ €	• • •	•	<b>*</b>		Ф_
				Z					4	<b>P</b>	4	•			
					₩					Ψ					

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#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

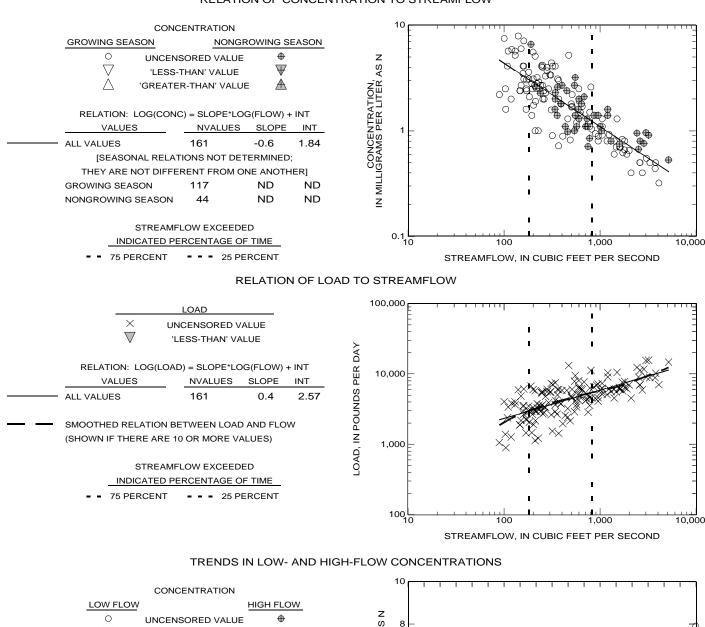
		LOAD			1	0,000	1 1	<del> </del>	1 1	<u> </u>
	×	UNCENSORED V				Ė		1	İ	3
	V	'LESS-THAN' VA	LUE		Α	-		1	Ì	× -
RE	LATION: LOG	G(LOAD) = SLOPE*LC	G(FLOW)	+ INT	PER D	-		1	ı	* _x _
	VALUES	NVALUES	SLOPE	INT	_	T T			l	
ALL VA	ALUES	97	0.52	1.81	DS			-	X	
					S	1,000		×× ×	<b>※</b> ^//	< * -
<u> —</u> sмоо	THED RELATI	ION BETWEEN LOAD	AND FLO	OW	Õ	-	,	XXXXX X		=
(SHOV	VN IF THERE	ARE 10 OR MORE VA	ALUES)		Ž	-	×		$\times \times$	
					Ď,	-		*****	'××`	-
	STR	EAMFLOW EXCEED	ED		OA	-	×	$\times$ $\times$ $\times$		-
	INDICAT	ED PERCENTAGE C	F TIME		_	-		×.×	•	_
_	75 PERCE	ENT = = 25 P	ERCENT					′×^	· 1	
						100			I , ,	
						100		100		1,000
							STREAMF	LOW, IN CUBI	C FEET PER S	SECOND

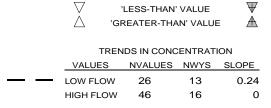
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

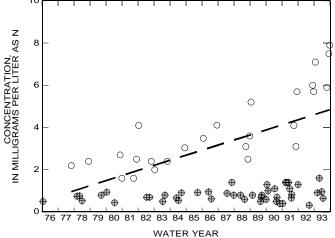
CONCENTRATION	
LOW FLOW HIGH FLOW	
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  ○ 'GREATER-THAN' VALUE ★	Σ
TRENDS IN CONCENTRATION	3.0 - O O O O
VALUES NVALUES NWYS SLOPE	
LOW FLOW 17 10 ND	ON
HIGH FLOW 35 14 0	
	1.0

0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW







#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCE	ENTRATION				10 E		<del> </del>	<del> </del>		<del></del>
GROWING SEASON	NONGR	OWING S	EASON		Ē				ı	=
O UNCENS	ORED VALUE	<b></b>	<u>.</u>	z	t				1	
√ 'LESS-T	HAN' VALUE	$\forall$		AS	1			•	1	
△ 'GREATER	r-THAN' VALUE	<b>A</b>		TON,	1 _		0	• • •		-
RELATION: LOG(CONC)	) = SLOPE*LOG	G(FLOW) +	- INT	FA FA	ŧ	0			1	=
VALUES	NVALUES	SLOPE	INT	눌胐	ţ			######################################	.₩	_
ALL VALUES	90	0	ND	CONCE	-		<b>•</b> •		, •	O⊕ 
[SEASONAL RELA	TIONS DETER	MINED;		Šδ			00		0	0
THEY ARE DIFFEREN	NT FROM ONE	ANOTHER	R]	00	0.1		0 8	R A O	. •	
GROWING SEASON	54	0	ND	Ī	Ŧ	$\nabla$	& ₩	$\triangle \Delta \Delta \infty$	•	=
NONGROWING SEASON	36	0	ND	Z	Ī	v	•	* *0	1	=
STREAMFL	OW EXCEEDE	D			Ī	1	1	1	1	_
INDICATED PER	RCENTAGE OF	TIME			0.01	0.1	1	10	100	1,000
75 PERCENT	25 PE	RCENT				STREAM	MFLOW, IN CUI	BIC FEET PE	R SECON	۷D
				D TO O	TDE 4 1 45	-1 -014/				

#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES	0 100 H
ALL VALUES 90 1.1 -0.12      SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	SOUNDO A TO THE TOTAL PROPERTY OF THE TOTAL
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	0.01 X Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y
	0.001 0.1 1 10 100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

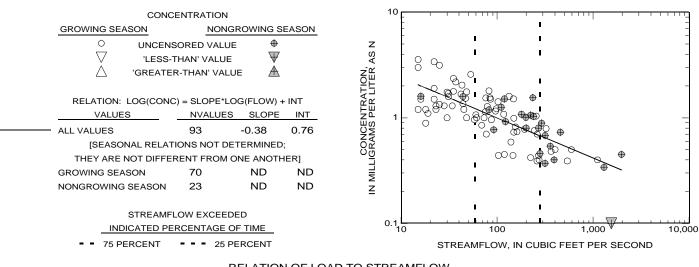
C	CONCENTR	ATION			0.5		-	-	_			-	1	1	1				Т	-	
LOW FLOW			HIGH FLOV																		
O UN	CENSORE	VALUE	<b>+</b>		0.4	L															_
, ,	ESS-THAN'		$\overline{\Psi}$																		
△ 'GRE	EATER-THA	.N' VALUE	■ ▲	[ ]			•	₽													
TDENIC	S IN CONC	ENTRAT	ION	RA-	0.3	-					$\oplus$										-
	NVALUES	NWYS	SLOPE	FIR					<b>⊕</b>												<b>⊕</b>
LOW FLOW	0	0	ND	CONCENTRATION,	0.2	L			Ψ		4	<b>,</b>									
HIGH FLOW	9	6	ND	CO SR/S	0.2			<b>+</b>													
				Ĕ								•									
				Ξ	0.1	<b>—</b>			0		•	₽									_
				≥																	
					0.0	76	77 7	78 7	9 80	81	82 8	3 84	85	86	87	88	89	90	91	92	93

WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

×	LOAD JNCENSORED \ 'LESS-THAN' V			γĄ	10,000		<del>                                      </del>		×	
RELATION: LOG(LO VALUES	AD) = SLOPE*LO NVALUES	OG(FLOW) SLOPE	+ INT INT	PER D	1,000	, X	· ××××		$\nabla$	
ALL VALUES	93	0.62	1.49	NDS	Ē	××				=
SMOOTHED RELATION (SHOWN IF THERE ARE			W	, IN POL	100		l	1 1		-
	MFLOW EXCEED			LOAD	-	· ^ · · · · · · · · · · · · · · · · · ·	! !	1		= = = = = = = = = = = = = = = = = = = =
75 PERCENT	<b>= = 2</b> 5 F	PERCENT			10		I L	I	1,000	10,000
								N CUBIC FEE		

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

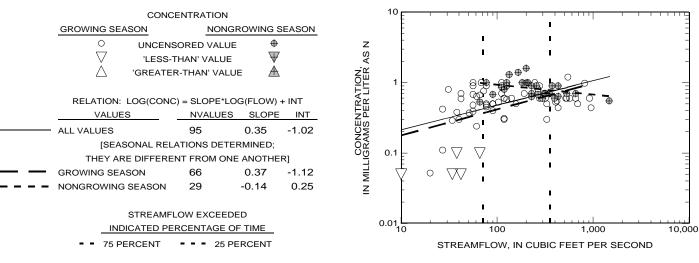
CONCENTRATION	
LOW FLOW HIGH FLOW	_
○ UNCENSORED VALUE ⊕	Z Ø 4.0 –
Control of the Contro	
riangle 'GREATER-THAN' VALUE $ riangle$	으쁜   ○
	IN MILLIGRAMS PER LIT
TRENDS IN CONCENTRATION	ΨΨ <b>FQ</b> O
VALUES NVALUES NWYS SLOPE	
LOW FLOW 33 15 0	2.0 - O
HIGH FLOW 14 9 ND	
	1.0
	Ψ Ψ .
	0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000 × × × × × × × × × × × × × × × × ×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	Y 1,000 X X X X X X X X X X X X X X X X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	NO NI ON NI
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100 1000 1,000 10,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			
LOW FLOW			HIGH FLOW		
, ,	NCENSORE 'LESS-THAN' REATER-TH <i>A</i>	VALUE	<ul><li>→</li><li>→</li><li>→</li><li>A</li></ul>	N 2.0	
TREN	IDS IN CONC	ENTRAT	ION	TRAT 1.5 L	5 — —
VALUES	NVALUES	NWYS	SLOPE	Äα Σπ	<b>⊕</b>
LOW FLOW	25	7	ND	COONCE GRAMS	0 - 0 ⊕ -
HIGH FLOW	19	6	ND	OS GR	

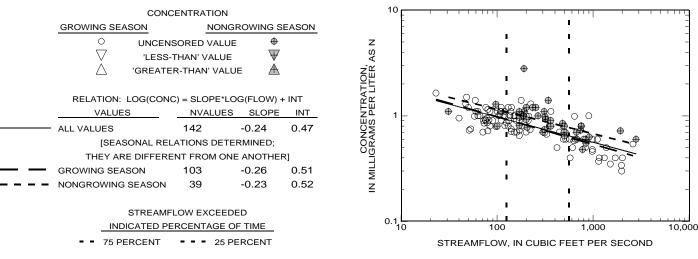
0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         142         0.76         1.2	IDS PER DA
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000 L
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT - 25 PERCENT	9
	100 100 1,000 10  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	
LOW FLOW HIGH FLOW	
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE  △ 'GREATER-THAN' VALUE ★	Z 94 2.0 – – ZH OLL:
TRENDS IN CONCENTRATION	
VALUES NVALUES NWYS SLOPE	
Low FLow 44 13 ND HIGH FLOW 34 12 ND	1.0 - 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0.5 - + + + + + + + + + + + + + + + + + +
	0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW

NOME OF A COLUMN A CO	t	O ' I	
ROWING SEASON NONGROWING SE	ASON	-400	
○ UNCENSORED VALUE	z		
	S +	a	
↑ 'GREATER-THAN' VALUE ♠	<i>₹</i> ₽		
	ō# [º		
DELATION: LOC(CONC) CLODE*LOC(FLOM)	NT 52		
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) +	<del>E</del> Ë	<b>* * * * * * *</b>	
VALUES NVALUES SLOPE	INT ZG 1		○ ⊕
L VALUES 84 -0.69	2.2 9 =		
[SEASONAL RELATIONS NOT DETERMINED;	INT 2.2 OOO 1	0	
THEY ARE NOT DIFFERENT FROM ONE ANOTHE	-[7]		0
OWING SEASON 60 ND	ND 🗒		Ŭ
NGROWING SEASON 24 ND	ND Z	•	
	= [	ı	
STREAMFLOW EXCEEDED		<u> </u>	
INDICATED PERCENTAGE OF TIME	0.100	1,000	
75 PERCENT 25 PERCENT	100	STREAMFLOW, IN CUBIC FEET	

#### RELATION OF LOAD TO STREAMFLOW

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000	-
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	10,000 - × × × × × × × × × × × × × × × × ×	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  2		-
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	X	_
	1,000 1,000 10  STREAMELOW IN CUBIC FEET PER SECOND	0,000

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

C	CONCENTRATION					
LOW FLOW		HIGH FLOW				
,'LE	CENSORED VALUE ESS-THAN' VALUE EATER-THAN' VALUI		ION, TER AS N	8-		
	S IN CONCENTRAT	ION SLOPE	ENTRAT PER LI	6-	0	
LOW FLOW	23 6	ND	ONCE	4 –		6
HIGH FLOW	17 4	ND	CONCE	2-	80	0
			Z			

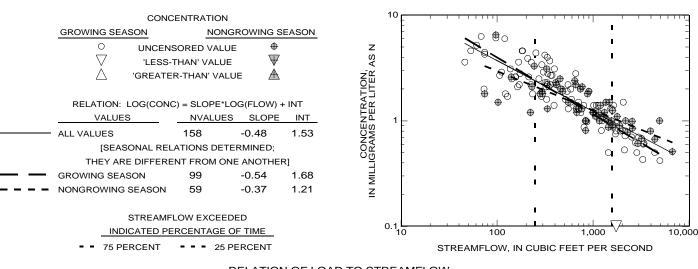
0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

$\begin{array}{c} \times \\ \overline{\mathbb{V}} \end{array}$	LOAD UNCENSORED \ 'LESS-THAN' V			≿	100,000		1	1 1 1	× -
RELATION: LOG(I	LOAD) = SLOPE*LO	OG(FLOW) SLOPE	+ INT INT	PER DA	10,000		ı •***		
ALL VALUES	158	0.52	2.27	NDS	E	*	× XXXXX	× × ·	3
SMOOTHED RELATIO	N BETWEEN LOAI	D AND FLO	w	POU	-	×		ı	-
(SHOWN IF THERE A	RE 10 OR MORE V	ALUES)		Ž	1,000	×××	× ×	$\nabla$	
STRE	AMFLOW EXCEED	DED		-OAE	<u> </u>	× ^	ı I	I	=
INDICATE	D PERCENTAGE (	OF TIME			-			Ī	-
75 PERCEN	NT = = = 25 F	PERCENT			-		ı	ı	-
					100	100	)	1,000	10,000
						STREAMFLOV	V, IN CUBIC F	EET PER SECC	OND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

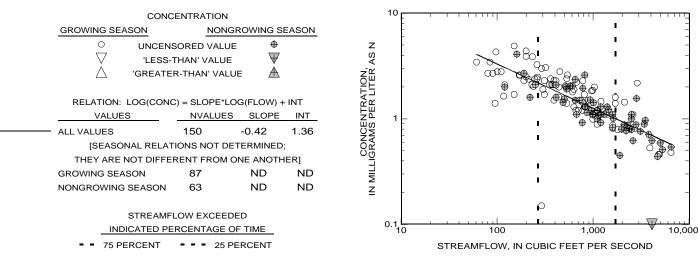
CONCENTRATIO	1
LOW FLOW	HIGH FLOW
<ul> <li>UNCENSORED VAL</li> </ul>	UE $\oplus$
√	JE $\overline{\Psi}$
△ 'GREATER-THAN' VA	LUE 🕭
TRENDS IN CONCENTE	ATION
VALUES NVALUES NW	SLOPE
LOW FLOW 35 13	ND
HIGH FLOW 35 14	ND

79 80 81 82 83 84 85 86 87 88 89 90 91 WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

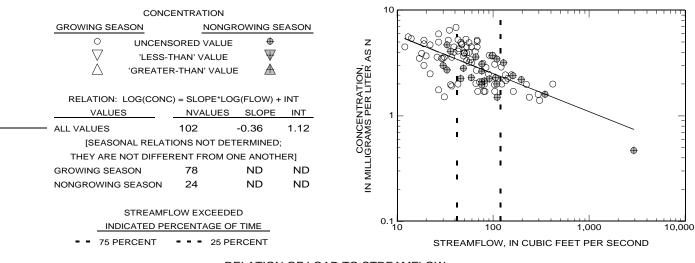
$\overline{\mathbb{X}}$	LOAD UNCENSORED VALUE 'LESS-THAN' VALUE	,	100,000			
VALUES  ALL VALUES  SMOOTHED RELATE	(LOAD) = SLOPE*LOG(FLOW)  NVALUES SLOPE  150 0.58  ON BETWEEN LOAD AND FLOARE 10 OR MORE VALUES)	2.09	10,000	×		× V
STR	EAMFLOW EXCEEDED ED PERCENTAGE OF TIME		1,000	X X 100 STREAMFLOW, IN	1 X 1,000	10,000

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		5.0		T	Ъ	1	1	г т	-	-	T	ı	-	Т	1		$\neg$
LOW FLOW         HIGH FLOW           ○         UNCENSORED VALUE         Φ           ✓         'LESS-THAN' VALUE         Ψ           △         'GREATER-THAN' VALUE         Δ	ION, TER AS N	4.0	_		00						0				C		· - 0
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	CONCENTRATION.	3.0			00	8 8	0	Э		$\infty$		<b>+</b>	0			O	
LOW FLOW 31 12 ND HIGH FLOW 34 14 0	CON	2.0	_	0	•	0		0	<del>)</del>			Ψ	0		<b>⊕</b>		Ω
	2 <u>Z</u>	1.0	•	⊕ <b>\$</b> <b>⊕ \$</b>		<b>+ +</b>	•		<b>⊕</b>			<b>⊕</b>		<b>⊕</b>			<del>•</del>
		0.0	76	77 78		80 81	82	83	84	85 8	86	87 8	38 8	9 9	0 91	92	93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD	100,000
× UNCENSORED VALUE  VLESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT   W   L   L   L   L   L   L   L   L   L	10,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  2	1,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	
	100 100 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ▲	CONCENTRATION, GRAMS PER LITER AS N	
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	ENTR S PER	
LOW FLOW 31 14 0 HIGH FLOW 17 11 ND	CONC PRAME	
	W 2	
		<b>+</b>

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW

[SEASONAL RELATIONS DETERMINED; ON DO SEASON 63 0 ND SEASON 63 0 ND SEASON 63 0 ND SEASON 63 0 ND SEASON CONTRACTOR OF THE PROPERTY OF THE PRO	CONCENTRATION		10	<del></del>
TLESS-THAN' VALUE  'GREATER-THAN' VALUE  RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT VALUES  NVALUES  NVALUES  SLOPE  INT  ALL VALUES  SEASONAL RELATIONS DETERMINED;  THEY ARE DIFFERENT FROM ONE ANOTHER]  GROWING SEASON  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME   OUT  OUT  OUT  OUT  OUT  OUT  OUT  O	GROWING SEASON NONGRO	WING SEASO	· •	
VALUES NVALUES SLOPE INT  ALL VALUES 82 0 ND  [SEASONAL RELATIONS DETERMINED; THEY ARE DIFFERENT FROM ONE ANOTHER] GROWING SEASON 63 0 ND NONGROWING SEASON 19 0 ND  STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	UNCENSORED VALUE VLESS-THAN' VALUE	<u></u>		
ALL VALUES 82 0 ND OND SEASONAL RELATIONS DETERMINED; STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME 150 0.01	RELATION: LOG(CONC) = SLOPE*LOG(	FLOW) + INT	A A O O	0
GROWING SEASON 63 0 ND NONGROWING SEASON 19 0 ND STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	VALUES NVALUES	SLOPE INT	ZU I	
GROWING SEASON 63 0 ND NONGROWING SEASON 19 0 ND STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	ALL VALUES 82	0 NE	ΣΣ Πω	
GROWING SEASON 63 0 ND NONGROWING SEASON 19 0 ND STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	[SEASONAL RELATIONS DETERM	MINED;	58	
NONGROWING SEASON 19 0 ND Z  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  0.01	THEY ARE DIFFERENT FROM ONE A	NOTHER]		
NONGROWING SEASON 19 0 ND Z  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  0.01	GROWING SEASON 63	0 NE	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
INDICATED PERCENTAGE OF TIME  0.01  1 10 100	NONGROWING SEASON 19	0 NE	Ž	
INDICATED PERCENTAGE OF TIME  0.01  100  100				
INDICATED PERCENTAGE OF TIME 1 10 100	STREAMFLOW EXCEEDED			
75 PERCENT 25 PERCENT STREAMFLOW, IN CUBIC FEET PER SECOND	INDICATED PERCENTAGE OF 1	ГІМЕ	10 100	
	75 PERCENT 25 PER	CENT	STREAMFLOW, IN CUBIC FEET PER S	ECOND

#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	
ALL VALUES 82 1 0.89	20 100 X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	
STREAMFLOW EXCEEDED CONTROL CO	
75 PERCENT 25 PERCENT	10 100 1,000
	STREAMELOW IN CUBIC EEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

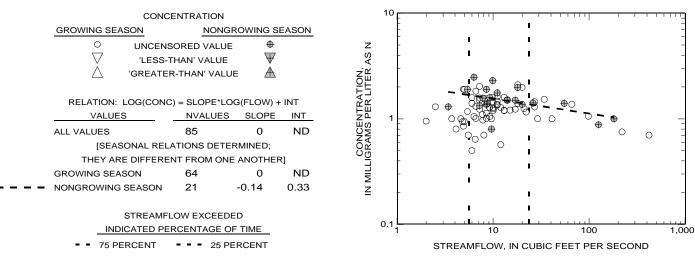
CONCENTRATION LOW FLOW HIGH FLOW		5.0	
O UNCENSORED VALUE ♥  VIESS-THAN' VALUE ♥  OGREATER-THAN' VALUE ★	ION, ITER AS N	4.0	_
TREMPO IN CONCENTRATION	RAT	3.0	- ⊕
TRENDS IN CONCENTRATION VALUES NVALUES NWYS SLOPE	SENTI IS PE		0
LOW FLOW 21 10 ND HIGH FLOW 16 11 ND	CONCENTRATION, IN MILLIGRAMS PER LITER	2.0	
	Z	1.0	
		0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

# APPENDIX 12. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRATE PLUS NITRITE 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

$\overline{\mathbb{V}}$	LOAD UNCENSORED VAL 'LESS-THAN' VALU		10,000 E	! !	1 1	<del></del>
RELATION: LOG(	(LOAD) = SLOPE*LOG( NVALUES S	FLOW) + INT	1,000		ı	
ALL VALUES		0.96 0.87	NDS	ı		
SMOOTHED RELATION	ON BETWEEN LOAD A	ND FLOW	Pou	1 1		
(SHOWN IF THERE A	RE 10 OR MORE VALU	JES)	Z 100	***		
STRE	EAMFLOW EXCEEDED	•	LOA	× XXX	<b>.</b>	
INDICATE	ED PERCENTAGE OF	TIME	_		I	
75 PERCE	NT = = = 25 PER	CENT	-	<b>/*</b> ****	1	
			10	10	100	<u> </u>
				STREAMFLOW	, IN CUBIC FEET PE	R SECON

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

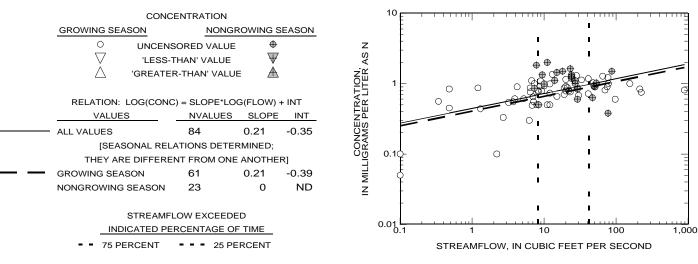
0

0

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

					2.5						
	CONCENTR	RATION			2.5		Т	1	1	Т	1
LOW FLOW			HIGH FLOW								
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	Z Ø	2.0	L					
▽ ,	LESS-THAN	' VALUE	$\overline{\Psi}$	%; A;	2.0			0			
△ 'GF	REATER-THA	AN' VALUI	e 🛦	S H							
				Ę-	1.5	L					
TREN	IDS IN CONC	CENTRAT	ION	A. T. A.					0	$\sim$	€
VALUES	NVALUES	NWYS	SLOPE	ΩN					01	U	
LOW FLOW	14	9	ND	AMS	1.0	L		<b>+ +</b>	Ω	_	0
HIGH FLOW	13	11	ND	00 00				* *(	<i>y</i>	O	Ŭ
				Ĭ				,	)		0
				M	0.5	L					
				Z							

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

<u></u>	LOAD				10,000		<del> </del>	<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>		
$\overline{\mathbb{X}}$	UNCENSORED V			×	1000			1	 	× =
RELATION: LOG VALUES	(LOAD) = SLOPE*LC NVALUES	OG(FLOW) SLOPE	+ INT INT	ER D	100			1		=
- ALL VALUES	84	1.21	0.38	NDS F	[		<b>&gt;</b>		I I	=
 SMOOTHED RELATION	ON BETWEEN LOAD	O AND FLC	ow	Pour	10	× •		× 1 1	ı	
(SHOWN IF THERE A	ARE 10 OR MORE V	ALUES)		Ď,	1		×		1	-
	EAMFLOW EXCEED			LOA	0.1	<i>/</i>		i	•	_
= 75 PERCE		ERCENT			3.1 ×			ı	I I	=
					0.01		1	10	100	1,00
						STREA	MFLOW, IN	CUBIC FEE	T PER SECO	ND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

					2.5											
	CONCENTR	ATION			2.5		1	1	ı	Т	1			- 1	- 1	
LOW FLOW			HIGH FLOW	-												
O U	NCENSORE	D VALUE	<b>⊕</b>	Z Ø V	2.0	_										
\triangle \tag{'}	'LESS-THAN'	VALUE	$\overline{\Psi}$										(	0		
△ 'GI	REATER-THA	N' VALUI	■ ▲	TER,										~		
				EAT.	1.5	_			<del>-</del>							
TREN	IDS IN CONC	ENTRAT	ION	NTRA PER					•							
VALUES	NVALUES	NWYS	SLOPE													
LOW FLOW	26	13	ND	CONCE IN MILLIGRAMS	1.0	_		C	) (II)	<b>,</b>						. 0
HIGH FLOW	18	11	ND	00 00 00	-				,	\$P	$\oplus$	0	$\oplus$		đ	
				Ĭ					(	_				Ψ.		Ψ.
				Ξ	0.5	_				_ &	D	0	,	8	0	
				Z					(	0		. ~		0	0	

0 0 Q

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

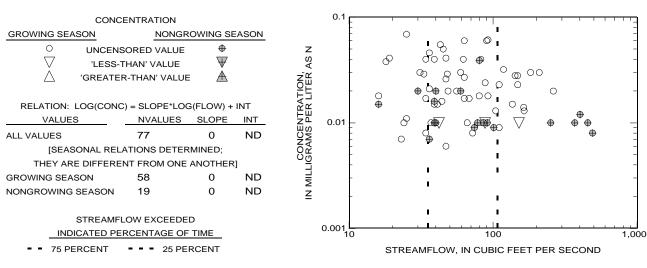
# **Appendix 13 Total nitrite**

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

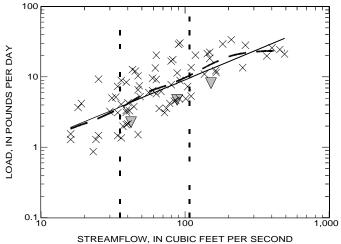
#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				E	
	×	UNCENSORED \	/ALUE			F	ī
	$\nabla$	'LESS-THAN' V	ALUE		>	F	I
					Δ	-	
	RELATION: LO	OG(LOAD) = SLOPE*LOCATION = SLOPE*LOCA	OG(FLOW)	+ INT	<u>د</u> 10	<u>,                                    </u>	
	VALUES	NVALUES	SLOPE	INT	Д .	ĺŧ	_ ^ 💥 🤅
	- ALL VALUES	77	0.85	-0.74	DS	E	× ×
					Z S	-	^`
- —	SMOOTHED RELA	ATION BETWEEN LOAI	D AND FLO	W	0	† \$	
	(SHOWN IF THER	E ARE 10 OR MORE V	ALUES)		Z ₁	L ×	. × ×
					Ď,	E	×
	S <sup>-</sup>	TREAMFLOW EXCEED	DED		o	E	Ī
	INDIC	ATED PERCENTAGE (	OF TIME		_	-	

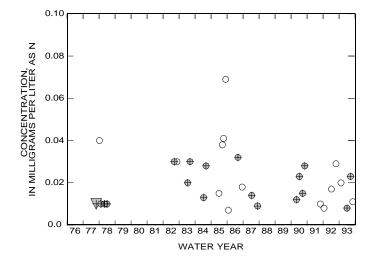
25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION									
LOW FLOW			HIGH FLOW						
Ο υ	NCENSORE	D VALUE	<b>⊕</b>						
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$						
△ 'GF	REATER-THA	N' VALUE	■ 🛦						
TREN	IDS IN CONC	ENTRAT	ION						
VALUES	NVALUES	NWYS	SLOPE						
LOW FLOW	14	7	ND						
HIGH FLOW	18	9	ND						

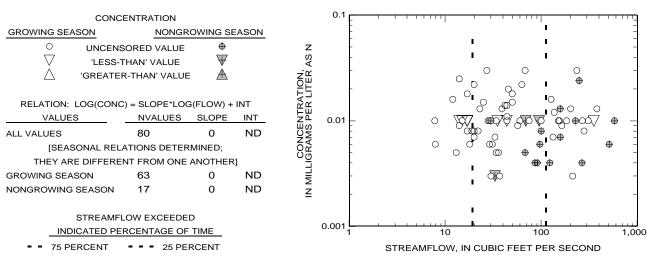
75 PERCENT



# APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

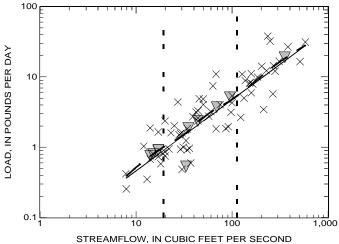
#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				100 E				
	× UNCENSORED VALUE									
	'LESS-THAN' VALUE									
					DAY	-				
RELATIO	N: LOG(LOAD	) = SLOPE*LC	G(FLOW)	+ INT		10				
VAL	UES	NVALUES	SLOPE	INT	PER	10				
ALL VALUES	3	80	1.01	-1.34	POUNDS	Ē				
— — SMOOTHED	RELATION BE	TWEEN LOAD	AND FLO	W	POL	F				
(SHOWN IF THERE ARE 10 OR MORE VALUES)										
	STREAMFL	OW EXCEED	ED		OAD	E				
	INDICATED PE	RCENTAGE C	F TIME		_	-				

- - 25 PERCENT

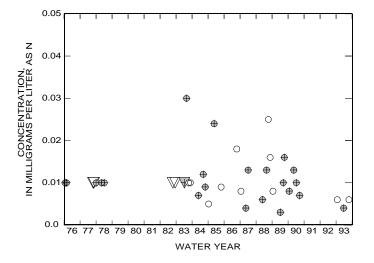


#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW		
Ο υ	O UNCENSORED VALUE				
$\nabla$ ,	√ 'LESS-THAN' VALUE  √				
TRENDS IN CONCENTRATION					
VALUES	NVALUES	NWYS	SLOPE		
LOW FLOW	15	9	ND		
HIGH FLOW	23	11	ND		

CONCENTRATION

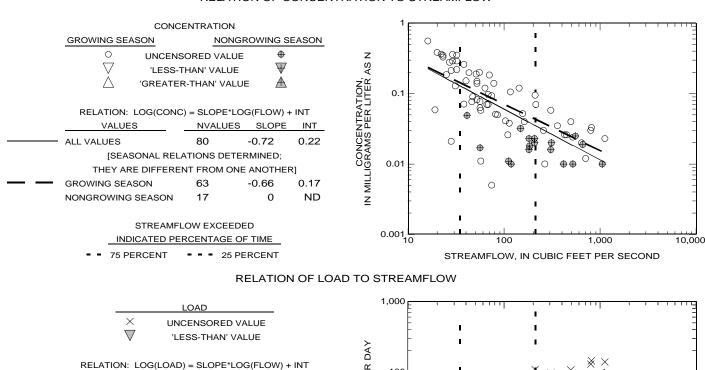
**75 PERCENT** 



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



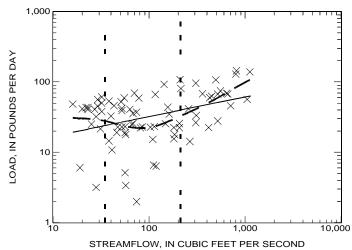
VALUESNVALUESSLOPEINTALL VALUES800.280.95

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION					
LOW FLOW			HIGH FLOW		
0	UNCENSORE	VALUE	<b>⊕</b>		
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$		
)· 🛆	GREATER-THA	N' VALUE	$\blacksquare$		
TRENDS IN CONCENTRATION					
VALUES	NVALUES	NWYS	SLOPE		

21

9

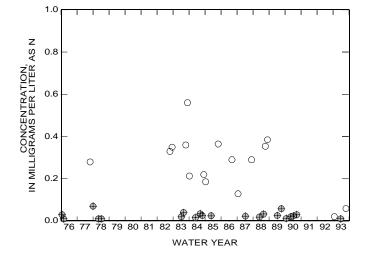
11

ND

ND

LOW FLOW

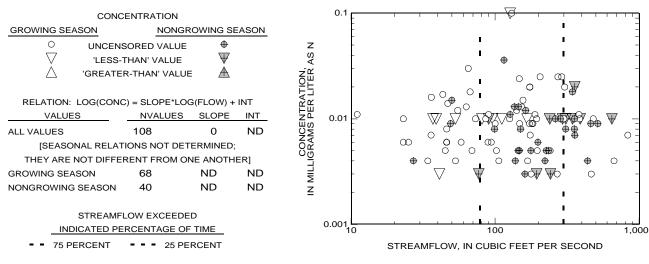
HIGH FLOW



# APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

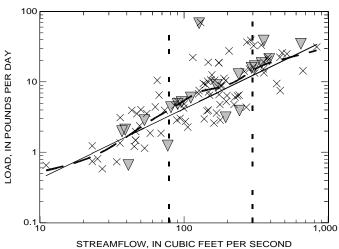
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



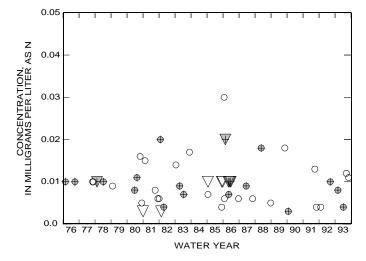
#### **RELATION OF LOAD TO STREAMFLOW**

_		LOAD		
		CENSORED V ESS-THAN' V		
	N: LOG(LOAD	•		
VALU		NVALUES	SLOPE	INT
ALL VALUES		108	0.99	-1.36
SMOOTHED I	RELATION BE	TWEEN LOAD	O AND FLO	W
(SHOWN IF T	HERE ARE 10	OR MORE V	ALUES)	
	STREAMFL	OW EXCEED	ED	
<u>IN</u>	NDICATED PE	RCENTAGE C	OF TIME	
<b></b> 75	PERCENT	25 P	ERCENT	



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

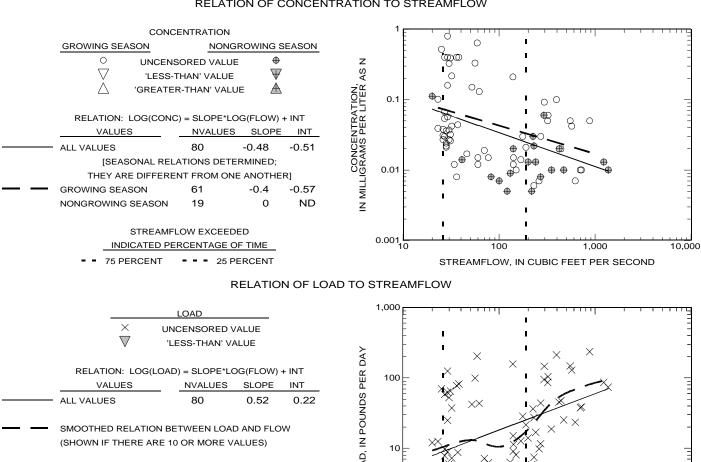
CONCENTRATION					
LOW FLOW			HIGH FLOW		
Ο υ	NCENSORE	O VALUE	<b>⊕</b>		
√ 'LESS-THAN' VALUE  √					
riangle 'GREATER-THAN' VALUE $ riangle$					
TRENDS IN CONCENTRATION					
VALUES	NVALUES	NWYS	SLOPE		
LOW FLOW	29	14	0		
HIGH FLOW	21	11	ND		



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

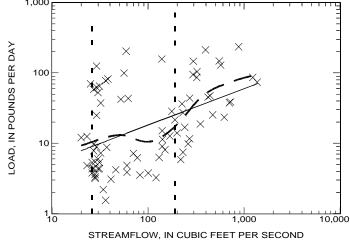
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME 75 PERCENT 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

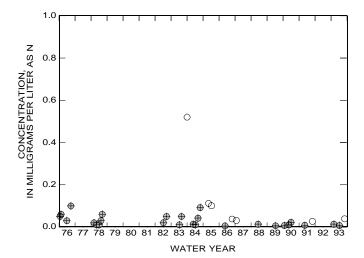
CONCENTRATION						
LOW FLOW			HIGH FLOW			
٥ ر	INCENSOREI	D VALUE	<b>+</b>			
$\nabla$	abla 'LESS-THAN' VALUE $ abla$					
△ 'GREATER-THAN' VALUE   A  A  A  A  B  C  C  C  C  C  C  C  C  C  C  C  C						
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	7	6	ND			

11

ND

26

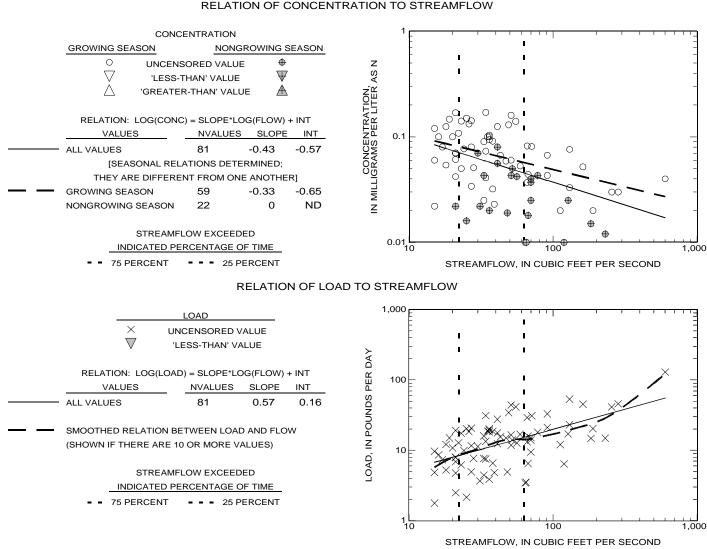
HIGH FLOW



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW	
٥ ر	JNCENSOREI	D VALUE	<b>⊕</b>	
$\nabla$	√ 'LESS-THAN' VALUE  √			
	REATER-THA	N' VALUE	■ 🛦	
TRENDS IN CONCENTRATION				
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	16	9	ND	

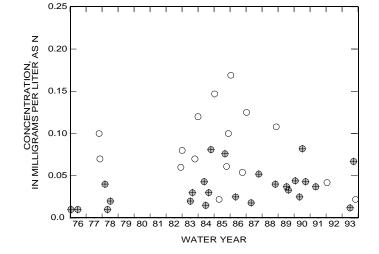
12

ND

25

HIGH FLOW

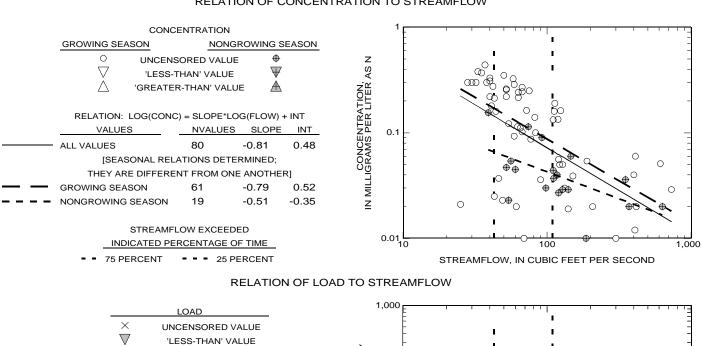
CONCENTRATION



# APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

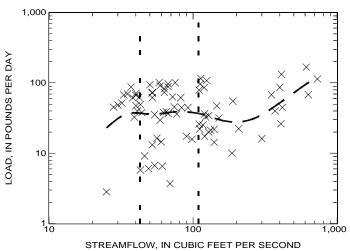
VALUESNVALUESSLOPEINTALL VALUES800ND

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



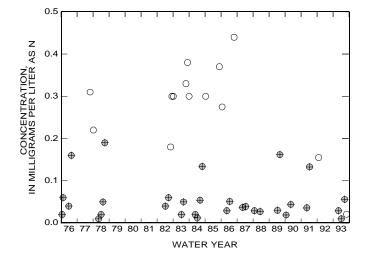
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION					
LOW FLOW			HIGH FLOW		
Ο υ	NCENSORE	D VALUE	<b>+</b>		
abla 'LESS-THAN' VALUE $ abla$					
TRENDS IN CONCENTRATION					
VALUES	NVALUES	NWYS	SLOPE		
LOW FLOW	14	8	ND		

12

ND

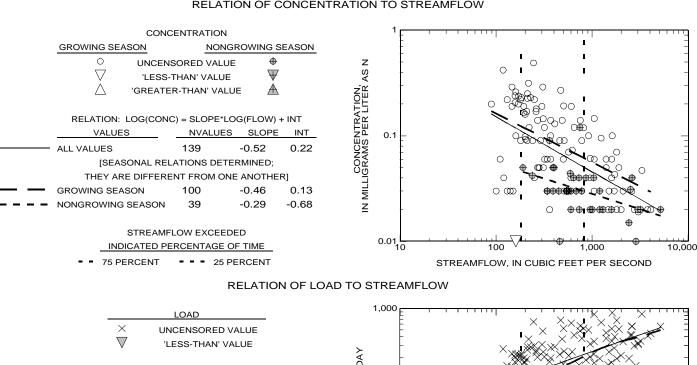
HIGH FLOW



### APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

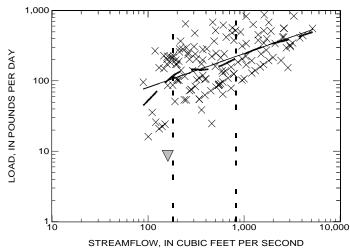
#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT NVALUES SLOPE 139 ALL VALUES

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

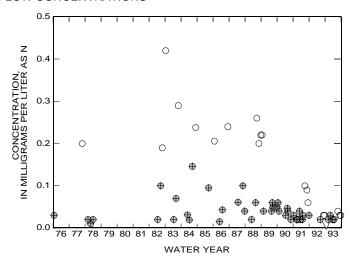
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>+</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$ ,	GREATER-THAN' VALU	e 🛦

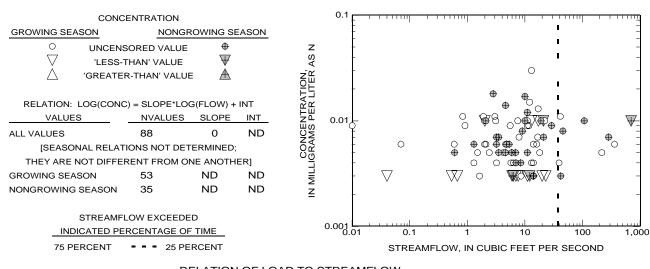
TRENDS IN CONCENTRATION						
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	20	10	ND			
HIGH FLOW	43	14	ND			



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	D D D D D D D D D D D D D D D D D D D
— ALL VALUES 88 1.02 -1.52  — SMOOTHED RELATION BETWEEN LOAD AND FLOW	ONDO O.1
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Z 0.01
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	0.001
	0.0001 0.1 1 10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

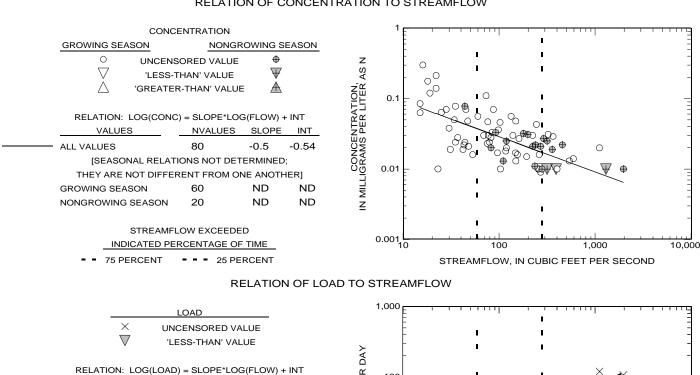
CONC	ENTRATION											
LOW FLOW		HIGH FLOW	_									
LESS-	ORED VALUE THAN' VALUE R-THAN' VALU	$\overline{\Psi}$	ATION, LITER AS N	0.020	_							_
TRENDS IN	CONCENTRAT	ION	TRAT ER LI	0.015	_							_
VALUES NVAL	UES NWYS	SLOPE	S N									
LOW FLOW 0	0	ND	ANO ANO ANO	0.010	₽	$\forall$		<b>⊕</b>				_
HIGH FLOW 9	6	ND	9 <u>6</u>			·		<b>⊕</b>				
			CONCENTRAIN MILLIGRAMS PER	0.005	_		<b>+</b>	<b>+</b>				<b>+</b>
			=			$\oplus$	Ψ					
				0.0	76 77	78 79	80 8	1 82 83 84	85 86 87	88 89 90	91 92	93

WATER YEAR

### APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

**VALUES** 

LOW FLOW

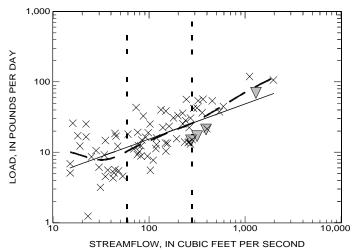
HIGH FLOW

ALL VALUES

NVALUES

SLOPE

STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
0	UNCENSORE	O VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'œ	SREATER-THA	N' VALUE	· A
TRE	NDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE

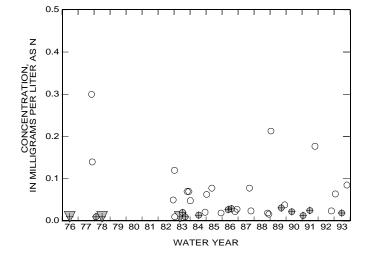
14

12

9

ND

ND



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION		
GROWING SEASON	NONGRO	OWING SE	ASON
	SORED VALUE	<b></b>	
	THAN' VALUE	$\forall$	
^	R-THAN' VALUE	À	
RELATION: LOG(CONC	s) = SLOPE*LOG(	(FLOW) +	INT
VALUES	NVALUES	SLOPE	INT
ALL VALUES	95	0	ND
[SEASONAL RELAT	IONS NOT DETE	RMINED;	
THEY ARE NOT DIFFER	RENT FROM ONE	E ANOTHI	ER]
GROWING SEASON	66	ND	ND
NONGROWING SEASON	29	ND	ND
	OW EXCEEDED		
= = 75 PERCENT	25 PER	CENT	

#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	1,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	100 × × × × × × × × × × × × × × × × × ×
ALL VALUES 95 1.01 -1.01	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	NO NO NO NO NO NO NO NO NO NO NO NO NO N
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	0.1 100 1,000 10,000

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	0.05	<sup>05</sup>
LOW FLOW HIGH FLO		
○ UNCENSORED VALUE ♥ ○ 'LESS-THAN' VALUE ♥ ○ 'GREATER-THAN' VALUE ♠	- Z % 0.04 - Z V OUL	04 -
	A 0.03	03 - 0 0 0 0 0
TRENDS IN CONCENTRATION	ËË	
VALUES NVALUES NWYS SLOPE	ASE	
LOW FLOW 25 7 ND	ŽĘ 0.02	
HIGH FLOW 19 6 ND	ა <u>ნ</u>	
	CONCENTRATION. IN MILLIGRAMS PER LITER. 10.0	
	0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

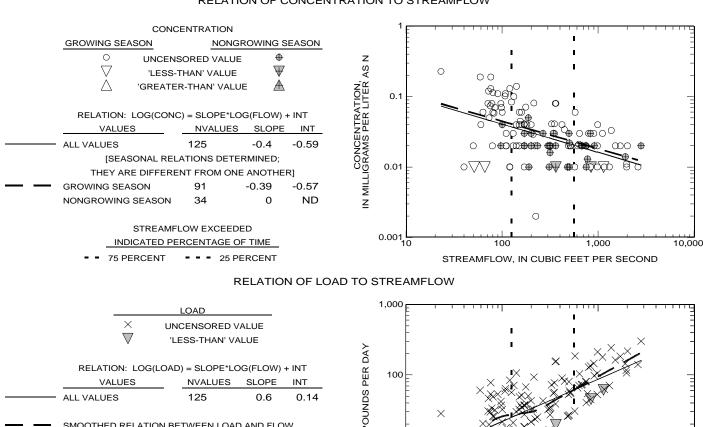
STREAMFLOW, IN CUBIC FEET PER SECOND

WATER YEAR

### APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

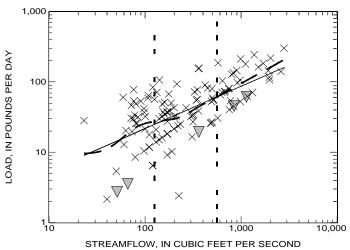
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

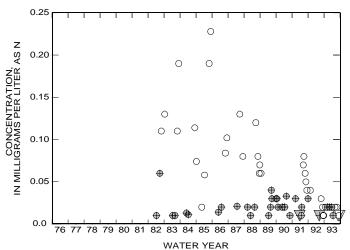
> STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$	'GREATER-THAN' VALUE	■ ▲
TD	ENDS IN CONCENTRAT	ION

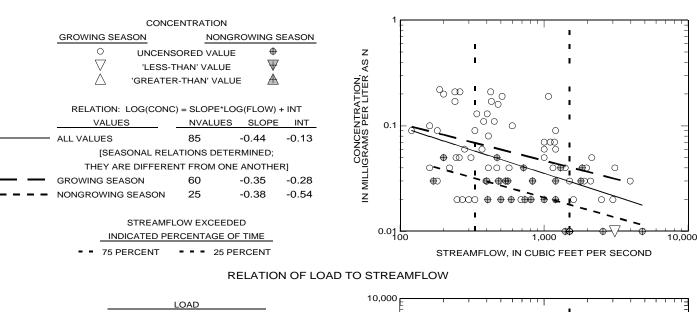
	IREN	DS IN CONC	ENTRAI	ION
	VALUES	NVALUES	NWYS	SLOPE
L	OW FLOW	35	11	ND
Н	IGH FLOW	33	11	ND



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01389005 PASSAIC RIVER BELOW POMPTON RIVER, AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD

X UNCENSORED VALUE

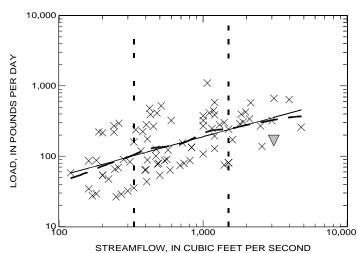
□ 'LESS-THAN' VALUE

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

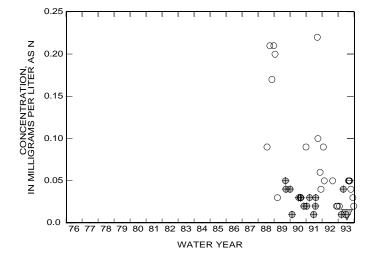
	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
O U	NCENSORE	D VALUE	<b>⊕</b>
$\triangle$	'LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GI	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	23	6	ND

4

ND

17

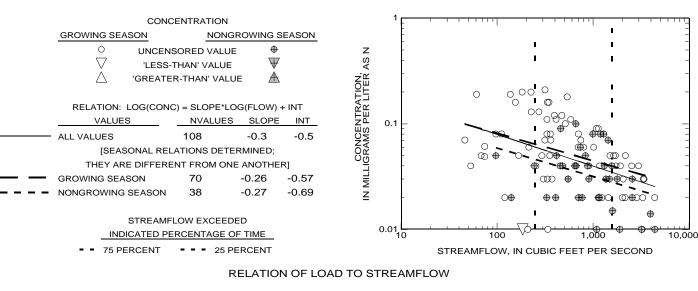
HIGH FLOW



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



<u>×</u> u	LOAD NCENSORED V	ALUE			1,000		· · · · · · · · · · · · · · · · · · ·	, , , ,
RELATION: LOG(LOA	LESS-THAN' VA		+ INT	ER DAY	100	**		×× -
VALUES	NVALUES	SLOPE	INT	PE	100	×	<b>**</b> ***	
ALL VALUES	108	0.7	0.23	UNDS	E	^ * * *	× · ·	=
SMOOTHED RELATION B	BETWEEN LOAD	AND FLC	W	РО	-		×	-
(SHOWN IF THERE ARE	10 OR MORE V	ALUES)		ζ	10	××××	1	
STREAM	FLOW EXCEED	ED		o,	E	-	<del>-</del>	=
INDICATED F	ERCENTAGE C	F TIME		_	-		1	_
■ ■ 75 PERCENT	25 P	ERCENT			-			_
					1 10	100	1,000	10,00
						STREAMFLOW, IN CU	BIC FEET PER SECON	٧D

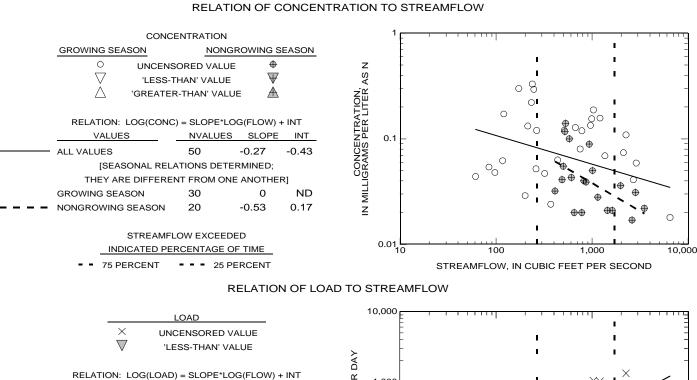
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		0.25		ı			-		т т	$\neg$
LOW FLOW HIGH F										
Z ZESS-THAN' VALUE	DN, ⊕	0.20	_	0		å	)			-
GREATER-THAN VALUE		0.15				0				
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	E NH S	0.15						С	)	
	ID AMO	0.10								
HIGH FLOW 24 8 N	ID SÃ					0			0	
	OI OI   III	0.05	_		<b>⊕</b>	<b>⊕</b>	<b>₩</b>	· •		O∰C
	_			<b>⊕</b>	<b>⊕</b>	<b>*</b>	<del>•</del>	⊕ <del>(</del>	⊕ • ⊕⊈	<u>,</u>
		0.0	76 77 78 79 80 81 82 83 84 85	<u> </u>	<del>⊕</del> 87	⊕ 88	89 9	90 91	92 9	93

WATER YEAR

### APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]



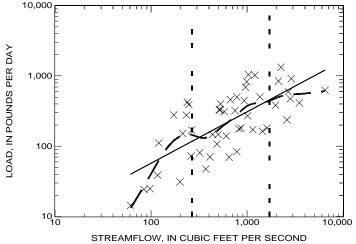
NVALUES SLOPE ALL VALUES SMOOTHED RELATION BETWEEN LOAD AND FLOW

**VALUES** 

HIGH FLOW

STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT

(SHOWN IF THERE ARE 10 OR MORE VALUES)

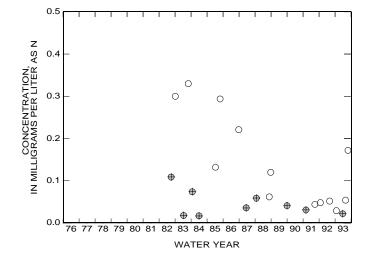


#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

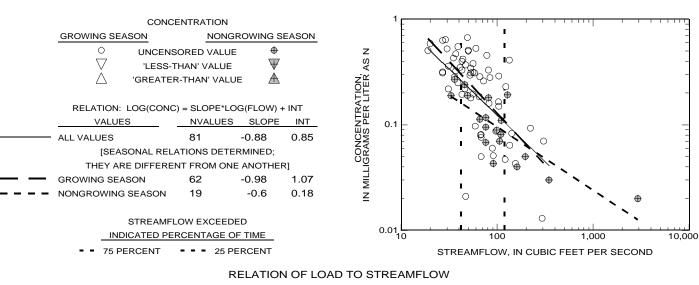
CONCENTRATION							
LOW FLOW			HIGH FLOW				
O и	<ul> <li>UNCENSORED VALUE</li> </ul>						
√ 'LESS-THAN' VALUE  √							
TRENDS IN CONCENTRATION							
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	13	7	ND				

8

ND



#### RELATION OF CONCENTRATION TO STREAMFLOW



			LOAD				1,000	<del>-                                    </del>	<del> </del>	1 1 1	9
		$\stackrel{\times}{ riangledown}$	UNCENSORED V 'LESS-THAN' VA			<u>}</u>	-	1 1 1 1 ×		×	
		ON: LOG(LC	OAD) = SLOPE*LO NVALUES	G(FLOW) +	INT INT	PER DA	100	× × × ×	× //		
	ALL VALUES	S	81	0	ND	ONDS	Ē		$\overline{}$		=
_	SMOOTHED	RELATION	BETWEEN LOAD	AND FLO	٧	PO	-	i ××× i	×		-
	(SHOWN IF	THERE ARE	10 OR MORE VA	ALUES)		Ď Ž	10	1			
		STREA	MFLOW EXCEED	ED		ο̈́	Ė	×			=
		INDICATED	PERCENTAGE O	F TIME		_	-	ı			-
	7	5 PERCENT	25 PE	ERCENT			-	i i			-
							10	100	1,000		10,000
								STREAMFLOW, IN CU	JBIC FEET PER	SECOND	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

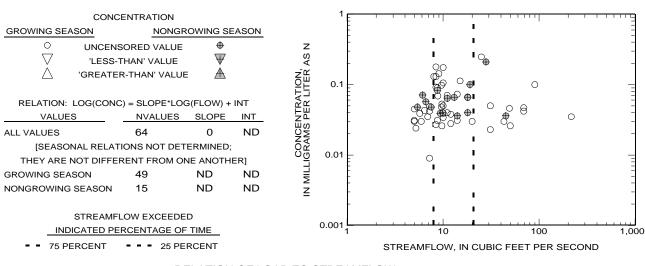
CON	CENTRATION			1.0	1 1	ı	1 1		ı	1 1	1			ı	1
LOW FLOW		HIGH FLOW	_												
'LESS	SORED VALUE -THAN' VALUE ER-THAN' VALUI	⊕ ₩ ±	ON, TER AS N	0.8	-										_
TRENIDS IN	CONCENTRAT	ION	CONCENTRATION.	0.6	_			0	0						_
	LUES NWYS	SLOPE	F.R.						V		$\circ$	0			С
LOW FLOW 18		ND	AMS	0.4	_				•	<del>)</del>	0			0	_
HIGH FLOW 14	10	ND	00 8						0	Ø	0			0	
			WILL.		0			<b>+</b>		0					
			<u> </u>	0.2	_			•		00			<b>⊕</b>		_
				0.0	· · · · · ·	<b>∌</b> ,			<b>*</b>		ı <b>—</b>	•	• •	1	<b>+ +</b>
				0.0	76 77	78 7	9 80 8	1 82 8	3 84	85 8	36 87	88 88	90	91 9	2 93

WATER YEAR

## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

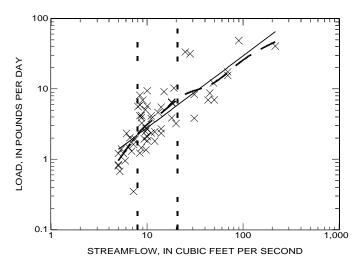
	<ul><li>X UNCENSORED VALUE</li><li> ▼ 'LESS-THAN' VALUE</li></ul>							
	RELATION: LOG(LOA	AD)	= SLOPE*LC	G(FLOW)	+ INT			
	VALUES		NVALUES	SLOPE	INT			
	ALL VALUES		64	1.02	-0.57			
_	SMOOTHED RELATION I (SHOWN IF THERE ARE				W			

LOAD

STREAMFLOW EXCEEDED

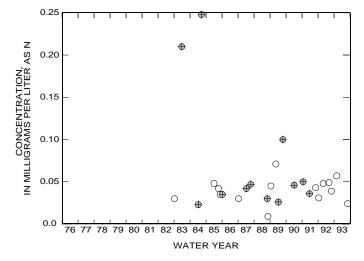
INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

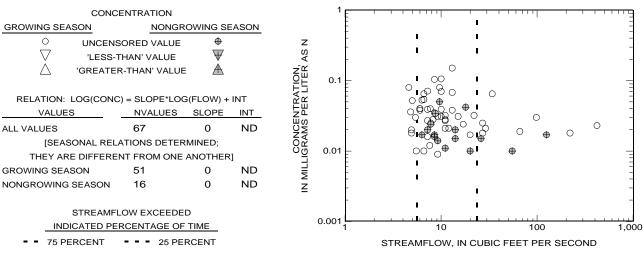
CONCENTRATION								
LOW FLOW			HIGH FLOW					
О U	NCENSORE	D VALUE	<b>+</b>					
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$					
△ 'GREATER-THAN' VALUE   ⚠								
TREN	DS IN CONC	ENTRAT	ION					
VALUES	NVALUES	NWYS	SLOPE					
LOW FLOW	15	8	ND					
HIGH FLOW	12	8	ND					



## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

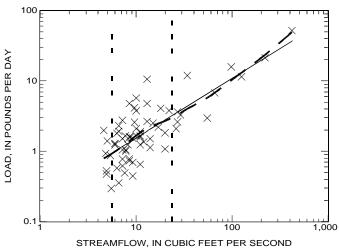
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

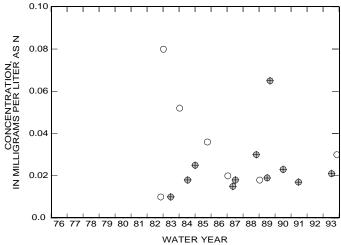
	LOAD				100
×	UNCENSORED V	/ALUE			E
V	'LESS-THAN' VA	ALUE		×	-
RELATION: LOG(L	LOAD) = SLOPE*LO	OG(FLOW)	+ INT	ER D	10-
VALUES	NVALUES	SLOPE	INT	2	! ' <b>`</b>
ALL VALUES	67	0.85	-0.66	NDS	
SMOOTHED RELATIO	N BETWEEN LOAI	O AND FLC	w	Pou	}
(SHOWN IF THERE AF	RE 10 OR MORE V	ALUES)		Z Z	1
STRE	AMFLOW EXCEED	ED		OAI	E
INDICATE	D PERCENTAGE C	OF TIME		_	· -
75 PERCEN	IT = = = 25 P	ERCENT			-



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

z s
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Π'Ω N'A
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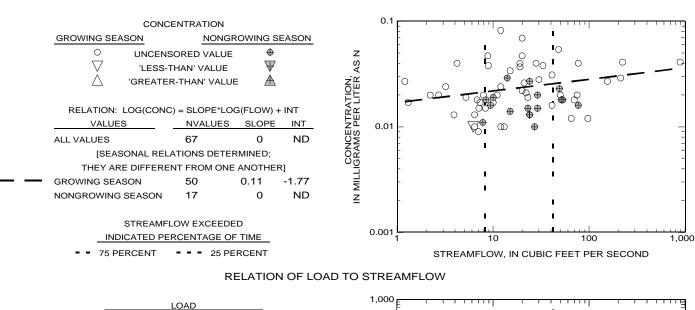
CONCENTRATION



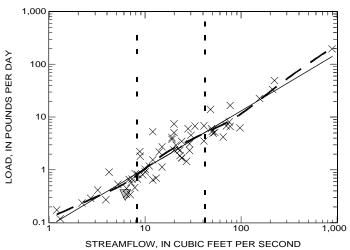
## APPENDIX 13. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL NITRITE 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



		LOAD						
_	× UNCENSORED VALUE  VLESS-THAN' VALUE							
RELATIO	N: LOG(LOA	D) = SLOPE*LO	OG(FLOW)	+ INT				
VAL	UES	NVALUES	SLOPE	INT				
ALL VALUES		67	1.09	-1.06				
- SMOOTHED	RELATION B	ETWEEN LOAI	O AND FLO	W				
(SHOWN IF 1	THERE ARE 1	0 OR MORE V	ALUES)					
	STREAM	FLOW EXCEED	ED					
<u></u>	NDICATED PI	ERCENTAGE C	OF TIME					
<b></b> 75	PERCENT	25 P	ERCENT					



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

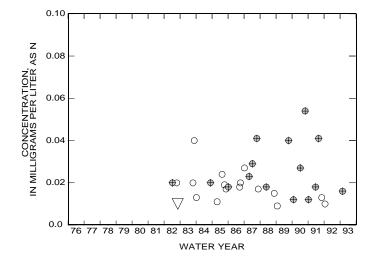
CONCENTRATION								
LOW FLOW HIGH FLOW								
Ο υ	NCENSORE	D VALUE	<b>⊕</b>					
√ 'LESS-THAN' VALUE  √								
△ 'G	REATER-THA	N' VALUE	<b>A</b>					
TRENDS IN CONCENTRATION								
VALUES	NVALUES	NWYS	SLOPE					
LOW FLOW	17	10	ND					

9

ND

15

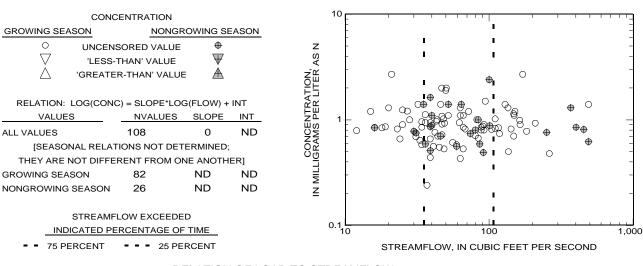
HIGH FLOW



# Appendix 14 Total ammonia plus organic nitrogen

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

#### RELATION OF CONCENTRATION TO STREAMFLOW

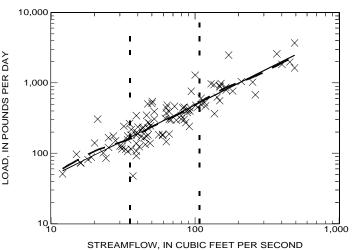


#### **RELATION OF LOAD TO STREAMFLOW**

_	L		10,000			
		CENSORED V SS-THAN' VA			×	-
RELATIO	N: LOG(LOAD)	= SLOPE*LC	G(FLOW) -	+ INT	R D	1,000
VAL	UES	NVALUES	SLOPE	INT	PE	1,000
ALL VALUES	;	108	1.02	0.65	SONOC	- - -
— SMOOTHED	RELATION BET	TWEEN LOAD	AND FLO	W	POL	-
(SHOWN IF <sup>-</sup>	ΓHERE ARE 10	OR MORE V	ALUES)		AD, IN	100
	STREAMFL	OW EXCEED	ED		o'	Į X
<u>_ I</u>	NDICATED PER	RCENTAGE C	F TIME_		_	-

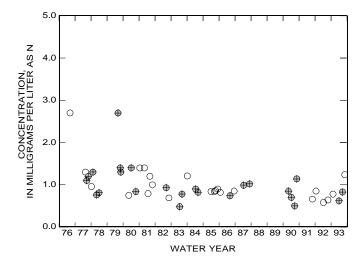
- - 25 PERCENT

75 PERCENT

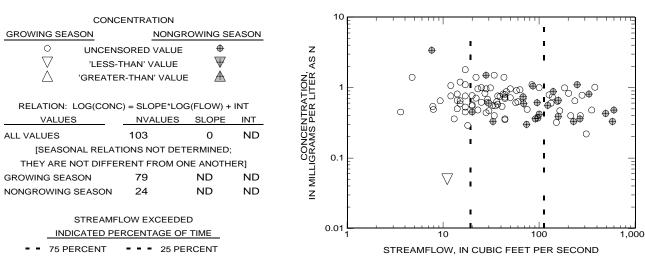


#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION	
LOW FLOW	HIGH FLOW		
Ο υ	D VALUE	<b>⊕</b>	
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	■ ▲		
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	22	11	ND
HIGH FLOW	25	11	ND



#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	1,000 BB BB BB BB BB BB BB BB BB BB BB BB
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	ND 100 X X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10 × 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	STREAMFLOW, IN CUBIC FEET PER SECOND

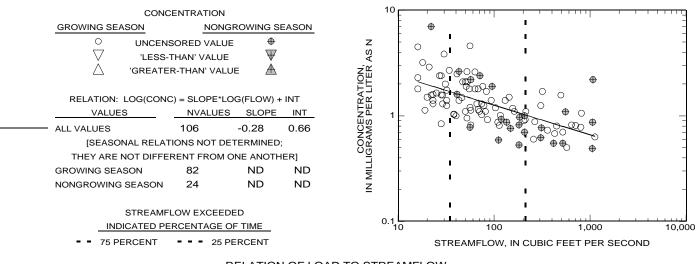
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	
LOW FLOW HIGH FLOW	
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼	Z Ø 4.0 Z <u>C</u>
∴ 'GREATER-THAN' VALUE      Æ	110 0 H
TRENDS IN CONCENTRATION	#H H H H H H H H H H H H H H H H H H H
VALUES NVALUES NWYS SLOPE	Σu
LOW FLOW 22 12 ND	U∑ Z
HIGH FLOW 26 15 0	OCONO 2.0 – O

0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

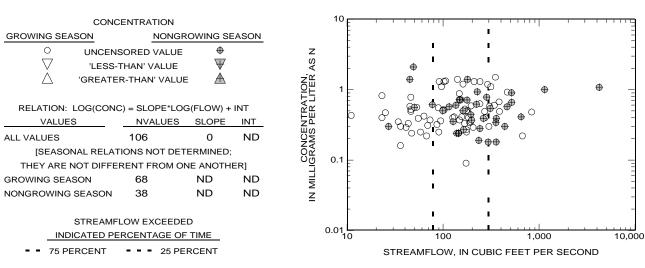
LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	10,000 ×
ALL VALUES 106 0.72 1.39	
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	1,000
75 PERCENT 25 PERCENT	100 1 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE ♥  ▽ 'LESS-THAN' VALUE ▼  △ 'GREATER-THAN' VALUE ▲	CONCENTRATION, IGRAMS PER LITER AS N	0
TRENDS IN CONCENTRATION	ξ ER	
VALUES NVALUES NWYS SLOPE	ÄΩ	
LOW FLOW 25 13 ND	NA VA 4	
HIGH FLOW 24 14 0	25. 25.	0
	N N	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT         X           VALUES         NVALUES         SLOPE         INT         U	10,000
ALL VALUES 106 1.08 0.25	1,000
(SHOWN IF THERE ARE 10 OR MORE VALUES)  Z STREAMFLOW EXCEEDED	100 ×
INDICATED PERCENTAGE OF TIME	
	10 100 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

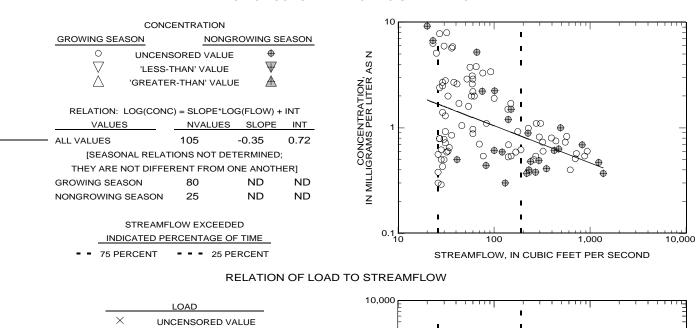
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		2.0	'	,	1 1	1	1 1	1 1		1 1	- 1	1 1	- 1	'
LOW FLOW	SH FLOW	_												
O UNCENSORED VALUE	Ψ (	Z 20, 2.0			0									_
√	W .													
△ 'GREATER-THAN' VALUE	DO OO OO OO OO OO OO OO OO OO OO OO OO O	Ī												
	\ ⊢ \	1.5	<u> </u>	•	₽									_
TRENDS IN CONCENTRATION	T. Y.	Į.	0											
VALUES NVALUES NWYS SI	<u>-OPE</u> Hu	<u>N</u>												
LOW FLOW 26 14	0 2	∑ ( 1.0	_ 4	<del>)</del>	<b>*</b>									_
HIGH FLOW 21 12	ND 86	צ ט			<b>⊕</b>		0			0		<del>•</del>		
		3			<b>⊕</b>	Φ_	e €			-				
		0.5			₩	⊕@ (	æ *	₽	0	$\Phi_{\mathcal{O}}$				→
	4	<b>≤</b>	<b>⊕</b>	<b>₽</b>		0	Φ _	0	<b>#</b>		0		B	***
			<b>⊕</b> •			~	. 0	(	S 0		(	)	_	0
		0.0	76 7	7 78	70	80 8°	1 82 8	3 84	85 8	6 87	88 80	90	01 0	2 03
			10 /	, ,,	19	00 0	02 0	5 64	05 6	0 07	00 08	90	91 9	2 93

WATER YEAR

25-

#### RELATION OF CONCENTRATION TO STREAMFLOW

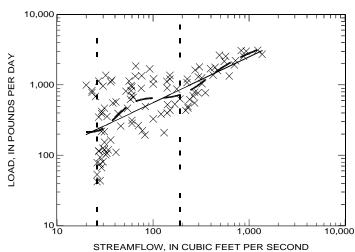


'LESS-THAN' VALUE

RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT NVALUES **VALUES** SLOPE 105 ALL VALUES

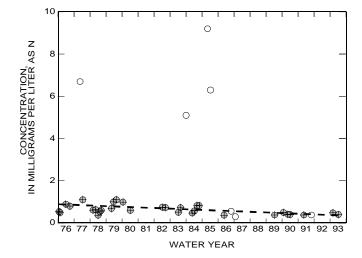
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

> STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT

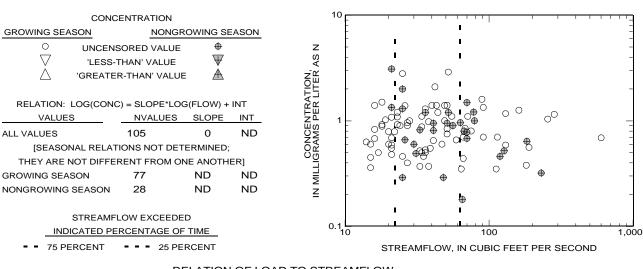


#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION										
LOW FLOW	/		HIGH FLOW									
0	O UNCENSORED VALUE											
$\nabla$	C'LESS-THAN' VALUE											
$\triangle$	≣ ▲											
_												
TF	RENDS IN CONC	ENTRAT	ION									
VALUES	NVALUES	NWYS	SLOPE									
LOW FLO	w 7	6	ND									
HIGH FLO	W 31	13	-0.03									



#### RELATION OF CONCENTRATION TO STREAMFLOW

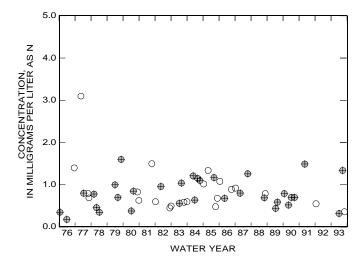


#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD				10,000	1 1	•	1 1 1 1
$\stackrel{ imes}{ riangledown}$	UNCENSORED V			DAY	Ē	1 1	! !	\/ <b>/</b>
RELATION: LOG(I	LOAD) = SLOPE*LO NVALUES	OG(FLOW) SLOPE	+ INT INT	PER D	1,000		× . × ×	×
 ALL VALUES	105	0.95	0.72	SOUNDS	-	××		××
 SMOOTHED RELATIO	N BETWEEN LOAD	O AND FLC	W	POL	-			
(SHOWN IF THERE AF	RE 10 OR MORE V	ALUES)		AD, IN	100		₹^	
STRE	AMFLOW EXCEED	ED		o o	E		^	
INDICATE	D PERCENTAGE C	F TIME		_	-	× ^	1	
<ul> <li>75 PERCEN</li> </ul>	IT = = = 25 P	ERCENT				1	ı	
					1010		100	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

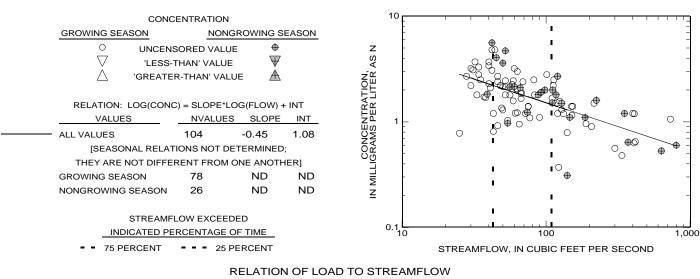
	CONCENTR	ATION								
LOW FLOW			HIGH FLOW							
О U	NCENSORE	D VALUE	<b>+</b>							
▽ ,	abla 'LESS-THAN' VALUE $ abla$									
☐ 'GREATER-THAN' VALUE ⚠										
TREN	DS IN CONC	ENTRAT	ON							
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	22	12	ND							
HIGH FLOW	32	16	0							



STREAMFLOW, IN CUBIC FEET PER SECOND

1,000

#### RELATION OF CONCENTRATION TO STREAMFLOW



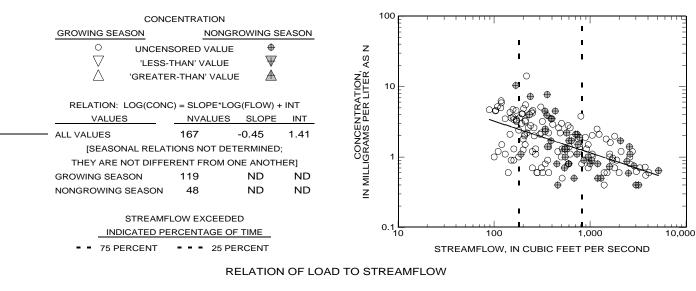
	LOAD		10,000		
$\stackrel{ imes}{ riangledown}$	UNCENSORED VALU		<u>-</u>	1 1	>
RELATION: LOG(L VALUES	.OAD) = SLOPE*LOG(F NVALUES SL	LOW) + INT OPE INT	ER D	ı ı	×××
ALL VALUES		.55 1.81	80	**************************************	× × ×
SMOOTHED RELATIO	N BETWEEN LOAD AN	D FLOW	5 1,000		** ×
(SHOWN IF THERE AF	RE 10 OR MORE VALU	ES)	Z Ú		×
	AMFLOW EXCEEDED	NAIT.	LOA	/×* * × × ×	<
= = 75 PERCEN	D PERCENTAGE OF TI		-	×	
			100	100	
				STREAMFLOW, IN CUBIC F	EET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		10	- 1	1	1	1	ı	1	1	1	ı	Т			- 1			
LOW FLOW HIGH FLOW	_																	
○ UNCENSORED VALUE	AS N	8	_															_
√ 'LESS-THAN' VALUE  √	_	Ĭ																
	ER,																	
	<b>₽</b> □	6	_															_
TRENDS IN CONCENTRATION	똤	Ĭ		)														
VALUES NVALUES NWYS SLOPE	CONCENTR, IN MILLIGRAMS PER											0						
LOW FLOW 20 11 ND	Š₹	4	_															_
HIGH FLOW 36 15 0	OS S		_	8			0	$\circ$	0									
	Ė		0		<b>⊕</b>		_	$\tilde{\circ}_{\Phi}$	0			0						
	₹	2	<u>Ф</u>		Ψ				0 (	9		~	_ <del>(</del>				. 0	
	Z	ļ	Ψ.	<b>+</b> 4	<b>⊕</b> €	<b>**</b>		4	<b>4</b> D	∪ (	₽	$\Phi_{C}$	) .	_	<b>*</b>	∌ ∜	Ф <sup>О</sup>	Ф
		4	<del>)</del>	4	r D ф			æ	₩ ⊕	) d			⊕(	₽	ΨΦ	. 4	,	40
		T		-	- Ψ	•			- 4	₩ <b>Ф</b>								4

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  SLOPE INT  ALL VALUES  167  0.55  2.15  0  0  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  INDICATED PERCENTAGE OF TIME	LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	>	100,000		
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	VALUES         NVALUES         SLOPE         INT           ALL VALUES         167         0.55         2.1           SMOOTHED RELATION BETWEEN LOAD AND FLOW		-		
100 100 1,000 10,00		LOAD,	-	100 1,000 10,000	000

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	25	
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE ♥  V 'LESS-THAN' VALUE ♥  △ 'GREATER-THAN' VALUE ★	Z 20 · VC	_
TRENDS IN CONCENTRATION	ER LITE	-
VALUES NVALUES NWYS SLOPE	äα Zα	
<b>–</b> LOW FLOW 29 14 -0.25	O∑ 20 10	_ 0
- HIGH FLOW 48 17 -0.046	00 08	
	CONCENTRATION. IN MILLIGRAMS PER LITER	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCI	ENTRATION				10		<del> </del>	<del> </del>		<del></del>
GROWING SEASON	NONG	ROWING S	EASON		ŧ				I	=
$\overline{}$	ORED VALUE	<b>⊕</b> ₩		Z SA	† - +			•	i i	-
, ,	R-THAN' VALU	E Å		TON,	<u> </u>		(	•	1	-
RELATION: LOG(CONC VALUES	) = SLOPE*LO NVALUES	G(FLOW) +	- INT INT	ΕĀ	4		0	○ <del>  </del> 	I ⊕	
ALL VALUES	99	0	ND	CONCENTR IGRAMS PER	' F				•	⊕ = = = = = = = = = = = = = = = = = = =
[SEASONAL RELATI				0.0 0.5	_	0 0	_0 🖲		, ₽ ⊂	0 0 0
THEY ARE NOT DIFFER				Ē	Ţ	0	go i		D <sub>⊕</sub> I	• •
GROWING SEASON	60	ND	ND	N M N	Ŷ		₩ 9			_
NONGROWING SEASON	39	ND	ND	Z	-			⊕ 4 <del>448</del> €€	. •	-
STREAMFL	OW EXCEEDE	ĒD								
INDICATED PER	RCENTAGE O	FTIME			0.1	0.1	1	10	100	1,000
75 PERCENT	25 PE	ERCENT				STREAM	MFLOW, IN	CUBIC FEET P	ER SECON	1D
	_	EL A TION			DE 4 4 4 E					

#### RELATION OF LOAD TO STREAMFLOW

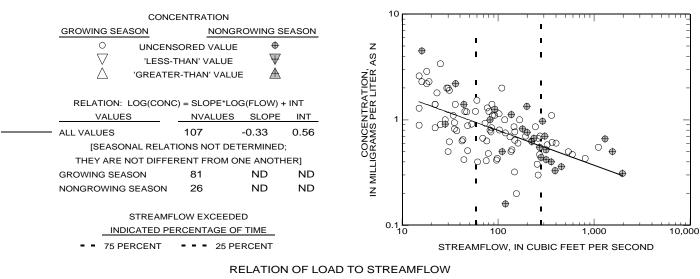
	LOAD UNCENSORED VA	ALLIE			10,000	<del> </del>			<del>-                                    </del>	
$\nabla$	'LESS-THAN' VA			≻A	1000				' ×	
RELATION: LOG(LO	DAD) = SLOPE*LO NVALUES	G(FLOW) SLOPE	+ INT INT	PER D	100			×	×	-
ALL VALUES	99	0.98	0.43	OUNDS	10=		~		ı	
SMOOTHED RELATION (SHOWN IF THERE AR			W	, IN POU	1				1	-
	MFLOW EXCEEDS			LOAD	0.1				1	= - -
75 PERCENT	「 ■ ■ ■ 25 PE	ERCENT			0.01	0.1	1	10	100	1,000
							AMFLOW, IN	I CUBIC FEET	PER SECO	ND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRA	TION			2.5		1	1 1	П	-	ı	ı	ı					ı	- 1	Т	
LOW FLOW  UNCENSORED  LESS-THAN' \  GREATER-THAN	VALUE /ALUE	IGH FLOW ⊕ ₩ Æ		2.0	_															_
TRENDS IN CONCE		N SLOPE_	ENTRATI S PER LI	1.5	_		<b>⊕</b>													=
LOW FLOW 0 HIGH FLOW 12	0 7	ND ND	CONCENTRATION.	1.0	_		<b>+ +</b>	<b>⊕</b>		<b>⊕</b>										-
			∑ <u>Z</u>	0.5	<b>-</b>	<b>+</b>	Ψ	<b>⊕</b>		<b>+ +</b>										<b>+</b>
				0.0	76 7	7 78	79	80 8	31 8	32 83	84	85	86	87	88	89	90	91	92	93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD		10,000	1 1 1	<del></del>	<del></del>	
× UNCENSORED VALUE		F			X <sub>V</sub> .	=
CLESS-THAN' VALUE	>	_	-	·	×	: ]
	Ś	5		v ×	× _//	-
RELATION: $LOG(LOAD) = SLOPE*LOG(FLOW)$	) + INT	1,000		ı × .^x		
VALUES NVALUES SLOPE	INT	1,000			&X	∃
ALL VALUES 107 0.67	1.29	3 - [	~ × × ?		,,	3
	3	5	\(\)\(\)\(\)			-
SMOOTHED RELATION BETWEEN LOAD AND FL	.ow	2 -		× ^ .		-
(SHOWN IF THERE ARE 10 OR MORE VALUES)	3	100		×^^ × ^ •		
	9	j .00 F	$\times$ $^{\prime}$ $\times$ $^{\prime}$ $^{\prime}$			=
STREAMFLOW EXCEEDED	č	<b>E</b>		1		3
INDICATED PERCENTAGE OF TIME	<u>-</u>	<b>'</b>		ı		-
75 PERCENT 25 PERCENT		-	ı			-
		10		100	1,000	10,000
			STREAM	IFLOW, IN CUB	IC FEET PER SE	COND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

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76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

0

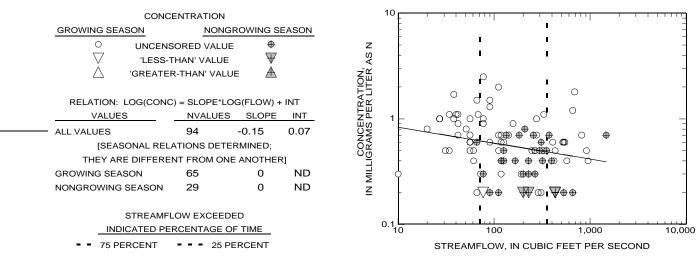
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	S	4.0	_
$\nabla$	LESS-THAN	VALUE	$\overline{\Psi}$	ž	7.0	
△ 'GF	REATER-THA	N' VALUI	E A	N H		0
				<u> </u>	3.0	
TREN	IDS IN CONC	ENTRAT	ION	동모	5.0	
VALUES	NVALUES	NWYS	SLOPE	Ω N. G.		0
 LOW FLOW	37	16	-0.089	A Z S	2.0	-0
HIGH FLOW	18	12	ND	0.0 7.0		<u> </u>
				Ë		0 0 0 0 0
				₹	1.0	• • • • • • • • • • • • • • • • • • • •

HIGH FLOW

CONCENTRATION

LOW FLOW

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

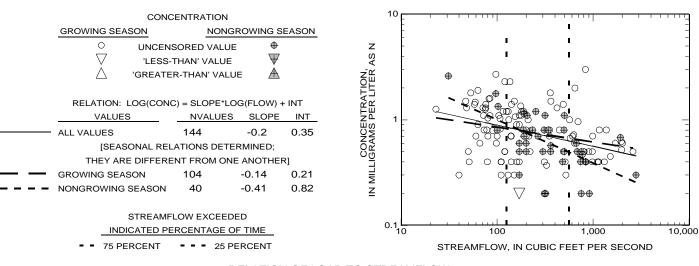
LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         94         0.85         0.8	1,000 × × × × × × × × × × × × × × × × × ×
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	2 100 X X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10 100 1,000 10,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCEN	ITRATION				' '	1 1	' '		1 1	ı	1 1	- 1			'	1
LOW FLOW	HIG	GH FLOW	_													
O UNCENSO	RED VALUE	<b>⊕</b>	Z S V	2.0	_											
√ 'LESS-TH	AN' VALUE	$\overline{\Psi}$											•	h		
△ 'GREATER-	THAN' VALUE	$\triangle$	TER,									0	-	Þ		
			<u> </u>	1.5	_								0		-	_
TRENDS IN CO	NCENTRATION	1	F.F.													
VALUES NVALUE	S NWYS S	LOPE	N N N N N N N N N N N N N N N N N N N								_	<b>⊕</b>		_		
LOW FLOW 25	7	ND	AZ AZ	1.0	_						0	U		00		4
HIGH FLOW 19	6	ND	25									0		0		
			∃								€		₩ ⊕	0	0	,
			CONCENTRA	0.5	_							○ €	$\bigoplus_{i} \Phi_i$	О	<b>⊕</b> €	€
			≥								_	_ '	⊕	<b>⊕</b>	4	.0
											+	₿		$\oplus$	0₩	
				0.0	76 77 7	8 79 80	) 81	82 83	3 84	85 86	3 87	88 89	9 90	91	92 93	
					. 5 // /	0,000	, 51	02 00	, 54	00 00	5 51	00 0.	5 50	01	J_ J	1

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE  >	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  144  0.8  1.08	
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	100
INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10 10 10 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

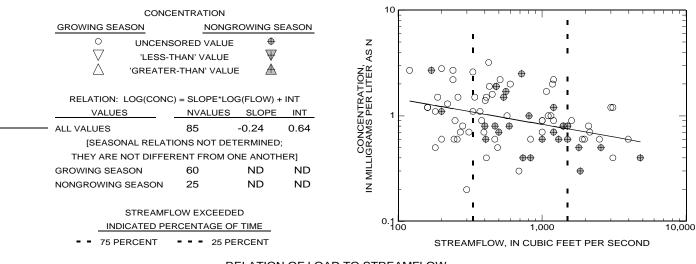
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	5.	.0		1 1 1 1 1 1	1 1
LOW FLOW HIGH FLOW					
O UNCENSORED VALUE ♥  VIESS-THAN' VALUE ▼  OREATER-THAN' VALUE ★	ION, TER AS N	.0 –			-
TRENDS IN CONCENTRATION	PER LI	.0 –	•	0	_
VALUES NVALUES NWYS SLOPE			O	0	
LOW FLOW 45 13 ND HIGH FLOW 36 13 ND	CO	.0 –			_

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

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#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES	10,000
<ul> <li>ALL VALUES 85 0.76 1.37</li> <li>SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)</li> </ul>	1,000 - X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	
	100 1,000 1,000 10  STREAMFLOW, IN CUBIC FEET PER SECOND

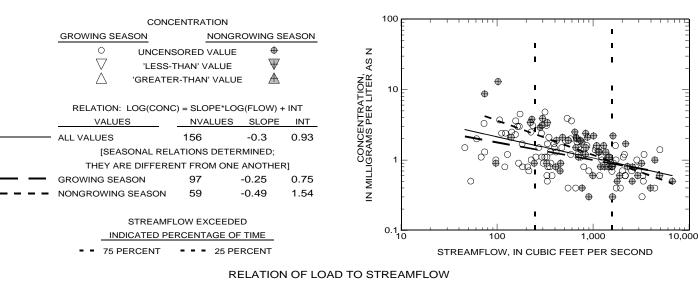
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

(	CONCENTR	ATION			5.0		ı	1			ı	1	1		1			1 1	'	'	
LOW FLOW			HIGH FLOW																		
<u> </u>	ICENSOREI	VALUE	<u>+</u>		4.0	L															_
, L	ESS-THAN'	VALUE	$\stackrel{\bullet}{\Rightarrow}$																		
△ 'GR	EATER-THA	N' VALUE	Ξ Α	NTRATION, PER LITER																	
				R L	3.0	H										_					-
	OS IN CONC			ËË												$\infty$	9			0	
VALUES	NVALUES	NWYS	SLOPE	ASE ASE												0					
LOW FLOW	22	6	ND	AN AN	2.0	_															-
HIGH FLOW	17	4	ND	0 <u>0</u>												С	)		0		
				CONCE												·		₽ Ф.	Ğ,		0
				z	1.0	_											Φ,	⊕ <b>⊕</b> ⊕	0	~	9
				_													#	₩	<b>∰</b>	$\infty_{\Phi}$	<b>Q</b>
					0.0		1				1		1							₽	اسو
					0.0	76 7	7 78	3 79	80 8	81 8	32 8	3 84	85	86	87	88	89	90 9	91 9	2 9	3

WATER YEAR

50-

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
	10,000 X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

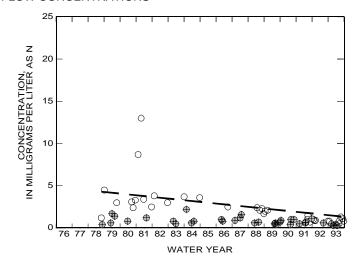
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

, ,	NCENSOREI LESS-THAN' REATER-THA	VALUE	
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
 LOW FLOW	34	13	-0.196
HIGH FLOW	35	14	0

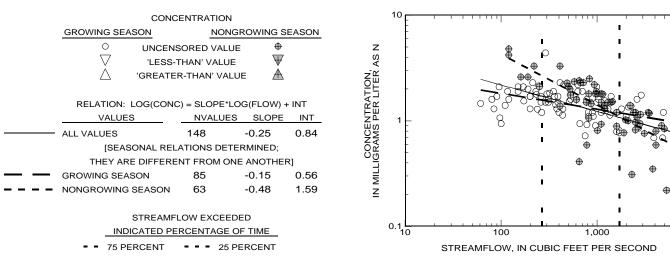
CONCENTRATION

HIGH FLOW

LOW FLOW



#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

10,000

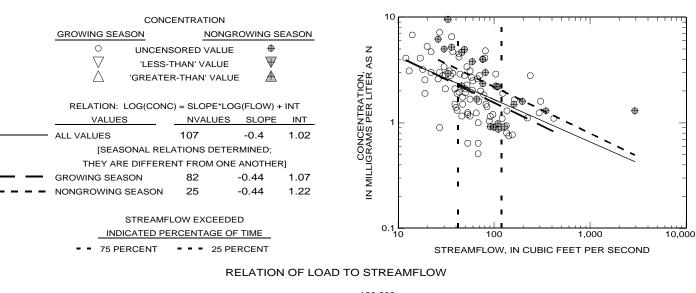
LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	10,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW  (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	1,000
	100 100 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	5			
LOW FLOW HIGH FLOW				
○ UNCENSORED VALUE	Z S 4	.0 –	0	_
V LESS-THAN VALUE W		.		
	岜		0	
I L	<u> </u>	.0	O	_
TRENDS IN CONCENTRATION	ER			
VALUES NVALUES NWYS SLOPE	S		0	
LOW FLOW 32 12 ND Z	IGRAMS PER LITER	.0 –	<b>6</b> 0	_
HIGH FLOW 34 14 0			° 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	• 0
		<b>⊕</b>	0 4 9 - 0	0 00
	∐ ₩ 1.	.о 🖁		○
	Z	Ψ		<b>⊕</b>
		<b>*</b>		
		4	<b>⊕</b>	

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	100,000
VALUES NVALUES SLOPE INT	Y 10,000 X 1 X 1 X X 1 X X X X X X X X X X X
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	1,000
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	
	100 10 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

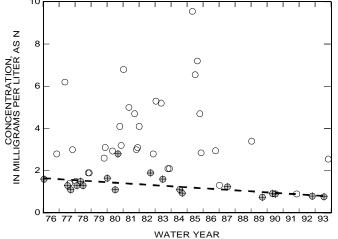
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW		
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	Z Ø	8
,	LESS-THAN'	VALUE	¥	-ζα -ζ	
△ 'GF	REATER-THA	N' VALUI	≣ Æ		
				R LI	6
TREN	IDS IN CONC	ENTRAT	ION	Ė	
VALUES	NVALUES	NWYS	SLOPE	Äα	
LOW FLOW	33	14	ND	AN AN	4
 HIGH FLOW	19	12	-0.048	GR	
				3	
				=	

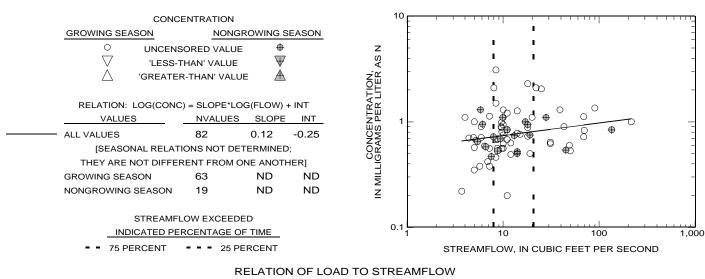
HIGH ELOW

CONCENTRATION

LOW ELOW



#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  SLOPE INT  ALL VALUES  82  1.12  0.48  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  ALL VALUES  82 1.12 0.48  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  Z  Z  Z  Z  Z  Z  Z  Z  Z  Z  Z  Z  Z	$\frac{}{}$	LOAD UNCENSORED VALUE 'LESS-THAN' VALUE	>	10,000	<u> </u>	1 1	1 1 1 1 1
(SHOWN IF THERE ARE 10 OR MORE VALUES)	(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	VALUES	NVALUES SLOPE	TAIL TAIL		 	- - - - - - - - - - - - - - - - - - -	
	75 PERCENT 25 PERCENT	(SHOWN IF THERE AI	RE 10 OR MORE VALUES)	A COAD, IN PC	10		(X) 	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			
LOW FLOW HIGH FLOW	_		
○ UNCENSORED VALUE ⊕	AS N	2.0	⊕ ⊕
abla 'LESS-THAN' VALUE $ abla$			
	ION, TER		
	누그	1.5	,_
TRENDS IN CONCENTRATION	CONCENTRAIN MILLIGRAMS PER		⊕ ○ ⊕
VALUES NWYS SLOPE	Ä.S		
LOW FLOW 22 10 ND	ΣŽ	1.0	ı⊢
HIGH FLOW 16 11 ND	00 80		• •
	$\exists$		00 0 0 0 0 0 0
	Σ	0.5	
	Z		8 0
			0
		0.0	70, 77, 70, 70, 00, 04, 00, 02, 04, 05, 00, 07, 00, 00, 04, 00, 02
			76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW

GROWING SEASON  O UNCEN  'LESS-	CENTRATION NONG SORED VALUE THAN' VALUE R-THAN' VALU	$\Psi$	EASON_	TION, TER AS N	
RELATION: LOG(CON	C) = SLOPE*LC	)G(FLOW) +	· INT	.R.R.	
VALUES	NVALUES	SLOPE	INT	F	
ALL VALUES	83	0	ND	CONCEI IGRAMS	0
[SEASONAL REL	_ATIONS DETE	RMINED;		QX A	
THEY ARE DIFFERE	ENT FROM ON	E ANOTHER	₹]	<sup>이</sup> 를 0.1 는	<u> </u>
GROWING SEASON	63	0	ND	d f	<u> </u>
NONGROWING SEASON	20	0	ND	Z -	₩ -
	FLOW EXCEED			0.01	10 100 1,000
= 75 PERCENT		ERCENT		'	STREAMFLOW, IN CUBIC FEET PER SECOND

#### RELATION OF LOAD TO STREAMFLOW

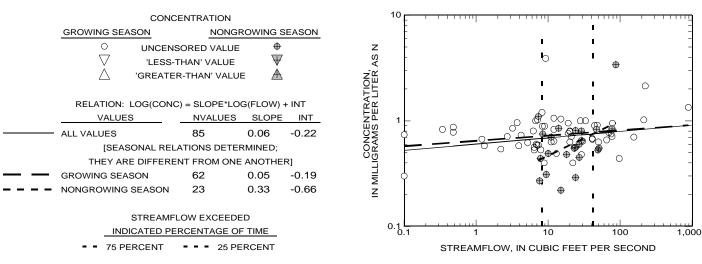
LOAD		10,000		<del> </del>	
$ imes$ uncensored value $ ilde{\mathbb{V}}$ 'less-than' value	<b>&gt;</b>	1000	1	 	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) - VALUES NVALUES SLOPE	PE TAIL	100=	1 1 ×	× ×	
ALL VALUES 83 1	0.51	100		×	
<ul> <li>SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)</li> </ul>	W N PC	10		1 1	
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	LOAI	1	<b>.</b>	1	-
75 PERCENT 25 PERCENT		0.1	1 10	100	1,000
			STREAMFLOW,	IN CUBIC FEET PER	SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		2.5	
O UNCENSORED VALUE  O 'LESS-THAN' VALUE	⋖	2.0	_
	NTRATION PER LITE	1.5	O 
VALUES         NVALUES         NWYS         SLOPE           LOW FLOW         14         9         ND           HIGH FLOW         13         11         ND	CONCENTRATION, IN MILLIGRAMS PER LITER	1.0	
	IN MIL	0.5	0
		0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT    VALUES	100
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED	10 × 1
INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	0.1 1 10 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		
LOW FLOW HIGH FLOW		
○ UNCENSORED VALUE	N 4.0 ER, 40	<u>−</u>
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	O'E LI	_
LOW FLOW 27 13 ND HIGH FLOW 18 11 ND	GRAMS GRAMS 0.0	_
	1.0 Z	

0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

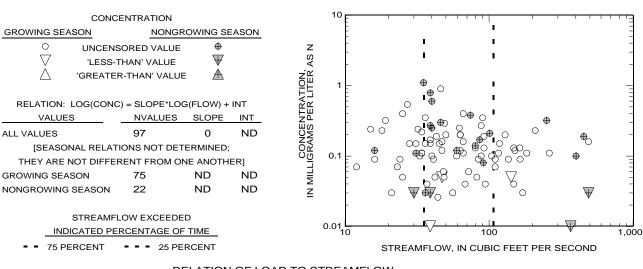
## Appendix 15 Total ammonia

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388000	Ramapo River at Pompton Lakes, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389005	Passaic River below Pompton River, at Two Bridges, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

## APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

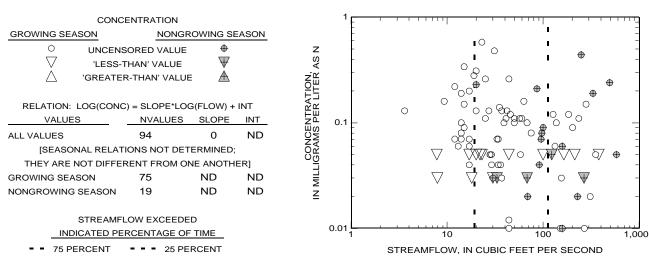
LOAD  X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE	1,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	
ALL VALUES 97 0.8 0.15  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	LOAD. IN POUL BY A STATE OF THE PART OF TH
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				1 1	1 1		1		1				'	' '
LOW FLOW			HIGH FLOW	_												
Ο υ	NCENSORE	D VALUE	<b>⊕</b>	Z S Z	2.0	_										_
,	LESS-THAN	VALUE	$\overline{\Psi}$	7												
△ 'G	REATER-THA	N' VALUI	■ ▲	TER,												
				ZAT	1.5	_										_
TREN	IDS IN CONC	ENTRAT	ION	异												
VALUES	NVALUES	NWYS	SLOPE	<u> </u>				_								
LOW FLOW	21	10	ND	AN AN	1.0	_		0								_
HIGH FLOW	22	11	ND	CONCENTRA												
				∃												
				IN MILL	0.5	_			(	)						_
				≥			•	~ ~	_		S					
							• • • • • • • • • • • • • • • • • • •		**************************************	<del>()</del> 7	) )	Φ.		<b>⊕</b>	ക	n_4
					0.0	76 77 7	8 79 80	81.8			5 86		8 89	177	91 9	2 93
							0 .0 00	٠. ٠	_ 00	٠. ٠		0. 0		•		_ 00

WATER YEAR

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	1,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	LOAD, IN POUR
	1 10 100 1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

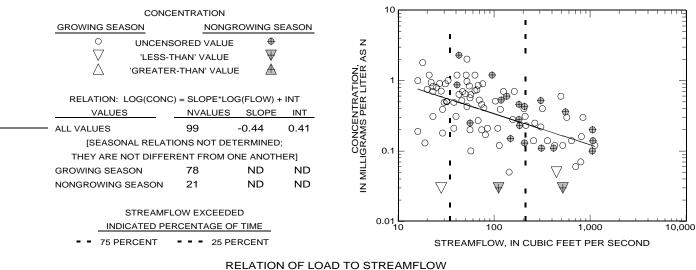
CONCENTRATION		
LOW FLOW HIGH FLOW	_	<b>⊕</b>
○ UNCENSORED VALUE ⊕	Z თ 0.4	_
abla 'LESS-THAN' VALUE $ abla$	_ :	
	CONCENTRATION IGRAMS PER LITER 70 80 80	0
	¥⊒ 0.3	-
TRENDS IN CONCENTRATION	봈	0
VALUES NVALUES NWYS SLOPE	SE	<b>•</b>
LOW FLOW 21 13 ND	ŽŽ 0.2	
HIGH FLOW 24 13 0	95 85	
		•
	⊒ ₩ <sub>0.1</sub>	
	<b>∠</b>	
	0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD			10,000		<del>11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</del>	<del>ппр</del>	
$\underline{\times}$	UNCENSORED VAL	UE		E	ľ	·		3
V	'LESS-THAN' VALU	E	>	-	1	ı ×	. X.,	-
RELATION: LOG( VALUES	LOAD) = SLOPE*LOG( NVALUES S	FLOW) + INT	PER DA	1,000	ı××	×××××××××××××××××××××××××××××××××××××××		
ALL VALUES		0.56 1.14	DS F	Ė	· · · · · · · · · · · · · · · · · · ·	××^	X	-
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Š	100	X	$\langle \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times$	7	=
— SMOOTHED RELATION	ON BETWEEN LOAD A	ND FLOW	PO	E		·		3
(SHOWN IF THERE A	RE 10 OR MORE VALU	JES)	Z	E	^× · · ×			
	AMFLOW EXCEEDED		LOAD	10	×	V 1		_
	D PERCENTAGE OF 1			F	V	I		=
= = 75 PERCEI	NT = = = 25 PER	CENT		t	I -	1		-
				1 10	1	100	1,000	10,000
					STREAMFL	OW, IN CUBIC FE	ET PER SEC	COND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		- 1		1
LOW FLOW HIGH FLOW	_			
○ UNCENSORED VALUE ⊕	AS N	2.0	<u>L</u> .	
abla 'LESS-THAN' VALUE $ abla$	_		0	
$ riangle$ 'GREATER-THAN' VALUE $ extcal{A}$	TER			
	トコ	1.5	<u></u>	_
TRENDS IN CONCENTRATION	TR/			
VALUES NWYS SLOPE	SEN		0	
LOW FLOW 22 13 ND	CONCE	1.0	- 0 0 .	_
HIGH FLOW 25 14 0	OS R			
	Ē			
	N MILL	0.5	<b>⊕</b>	_
	Z			
		0.0	<u> </u>	7
			76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93	3

WATER YEAR

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

GROWING SEASON  O UNCENS  'LESS-	ENTRATION  NONGROWING  SORED VALUE  THAN' VALUE  R-THAN' VALUE	G SEASON ⊕ ₩ Æ	ER AS N	
RELATION: LOG(CONC VALUES ALL VALUES	C) = SLOPE*LOG(FLOV NVALUES SLOPE 89 0	•	CONCENTRATIC GRAMS PER LIT 100	
[SEASONAL RELAT	IONS NOT DETERMIN	IED;	GRAN	
THEY ARE NOT DIFFEL GROWING SEASON NONGROWING SEASON	59 ND 30 ND	ND ND	W WILL	
	LOW EXCEEDED  RCENTAGE OF TIME  25 PERCENT	<u>-</u> г	0.01	100 T1,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### RELATION OF LOAD TO STREAMFLOW

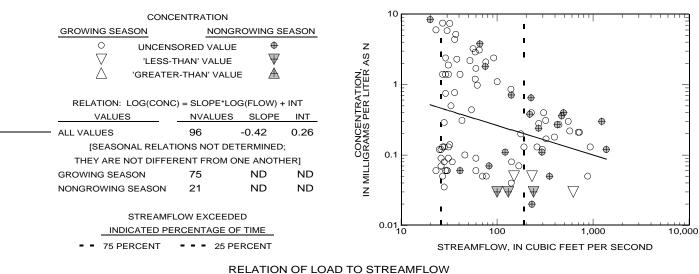
×	LOAD UNCENSORED V			4	10,000			*	- - -
RELATION: LOG( VALUES	LOAD) = SLOPE*LO _NVALUES	OG(FLOW) SLOPE	+ INT INT	PER DA	1,000		******		
ALL VALUES	89	1.02	-0.56	JNDS	100 =	×			
SMOOTHED RELATION (SHOWN IF THERE A			DW .	), IN POL			1××		
	:AMFLOW EXCEED ED PERCENTAGE C			LOAD	10		√		
75 PERCE!	NT <b>= = =</b> 25 P	ERCENT			1 10	× ,	I 00 1,00	0 1	10,000
						STREAMFLO	W, IN CUBIC FEET PE	R SECOND	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	0.5
LOW FLOW         HIGH FLOW           ○         UNCENSORED VALUE         ⊕           ○         'LESS-THAN' VALUE         ₩           △         'GREATER-THAN' VALUE         ★	AS AS AS AS AS AS AS AS AS AS AS AS AS A
TRENDS IN CONCENTRATION  VALUES NVALUES NWYS SLOPE	W PER LI
LOW FLOW 24 14 0 HIGH FLOW 15 10 ND	IN MILLIGRAMS PER LITER  0.0 0
	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT   YALUES   NVALUES   SLOPE   INT   1,000	
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	10 100 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	
LOW FLOW HIGH FLOW	_
○ UNCENSORED VALUE ⊕	Z Ø 8
abla 'Less-than' value $ abla$	
△ 'GREATER-THAN' VALUE   A  A  A  A  B  C  A  B  C  A  B  C  C  C  C  C  C  C  C  C  C  C  C	CONCENTRATION.  CONCENTRATION.
	F-1, 6- 0
TRENDS IN CONCENTRATION	K. H. C. C. C. C. C. C. C. C. C. C. C. C. C.
VALUES NVALUES NWYS SLOPE	ÄΩ
LOW FLOW 7 6 ND	925 4-
HIGH FLOW 29 12 0	000
	⊒
	\(\bar{2}\) -
	4
	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
	10 11 10 19 00 01 02 03 04 05 00 01 00 09 90 91 92 93

WATER YEAR

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION  GROWING SEASON  O UNCENSORED VALUE  VILESS-THAN' VALUE  O GREATER-THAN' VALUE  RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  NVALUES  SLOPE INT  ALL VALUES  97  O ND  [SEASONAL RELATIONS NOT DETERMINED;  THEY ARE NOT DIFFERENT FROM ONE ANOTHER]  GROWING SEASON  71  ND  NONGROWING SEASON  26  ND  ND	N MILLIGRAMS PER LITER AS N  TO CONCENTRATION,  TO	T
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT		,000

#### RELATION OF LOAD TO STREAMFLOW

$\overline{\hspace{1em}}^{ imes}_{\hspace{1em}}$	LOAD  UNCENSORED VALU 'LESS-THAN' VALUE		1,000 > \$	E - - -		——————————————————————————————————————
RELATION: LOG(L VALUES ALL VALUES	-	ELOW) + INT LOPE INT .14 -0.3	DS PER D			
SMOOTHED RELATIO			IN POUN	- -		-
	AMFLOW EXCEEDED D PERCENTAGE OF T T 25 PERC		ГОАБ	-	* * * * * * * * * * * * * * * * * * *	1,000
					STREAMFLOW, IN CUBIC FEET PER SECOND	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

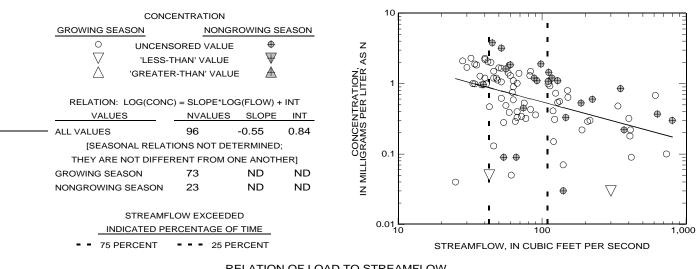
CONCENTRATION		
LOW FLOW HIGH FLOW	_	
$\circ$ uncensored value $\oplus$ $\forall$ 'less-than' value $\oplus$ $\Diamond$ 'greater-than' value $\oplus$	ON, TER, AS N	- • o
	9.0 RA	-
TRENDS IN CONCENTRATION	ĖË	
VALUES NVALUES NWYS SLOPE	μ̈́ο	0 0
LOW FLOW 20 11 ND	0.4 0.4	⊕    ⊕    ⊕
HIGH FLOW 31 15 0	28	# # O
	CONCENTRATION. IN MILLIGRAMS PER LITER 7.0 7.0 8.0	
	Z 0.2	
	0.04	
	0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

1.0

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD	10,000
<ul><li>X UNCENSORED VALUE</li><li> √ 'LESS-THAN' VALUE</li></ul>	¥ .and
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	B 1,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	100 X X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	V V V V V V V V V V V V V V V V V V V
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			'	1		'	١	1						1	1 1		1
LOW FLOW HIGH FLOW	_			0			(	)									
○ UNCENSORED VALUE	AS N	2.0						)		(	0						
abla 'LESS-THAN' VALUE $ abla$	_ 7					0				C	)						
riangle 'GREATER-THAN' VALUE $ riangle$	ΘË								)								
	AT.	1.5	L									Ф					_
TRENDS IN CONCENTRATION	ΕÄ											Ψ					
VALUES NVALUES NWYS SLOPE	SEN		<b>+</b>					С	)		- 0	)					
LOW FLOW 16 10 ND	CONCENTRATION, IGRAMS PER LITER	1.0	_			(	o c	) (	) (	)	<b>⊕</b>			<b>⊕</b>	Φ(	<u> </u>	_
HIGH FLOW 35 14 0	98			#	•					)					Φ `		
	$\exists$										$\oplus$	<b>⊕</b>		<del>•</del>			
	IN MILL	0.5	L	₩	<b>+</b>							•		<b>⊕</b>			_
	Z		<del>•</del>		<b>+</b>		<b>+</b>	<b></b>	$\oplus^{\oplus}$	<del>)</del>							
				<b>Φ</b>	- +		0					_	1				<b>⊕</b>
		0.0	<u> </u>									<u></u> `	<u> </u>	<del>- +</del>			$\Box$
			76	77 78	79 8	0 81	82	83	84	85	86	87	88	89 90	91	92	93

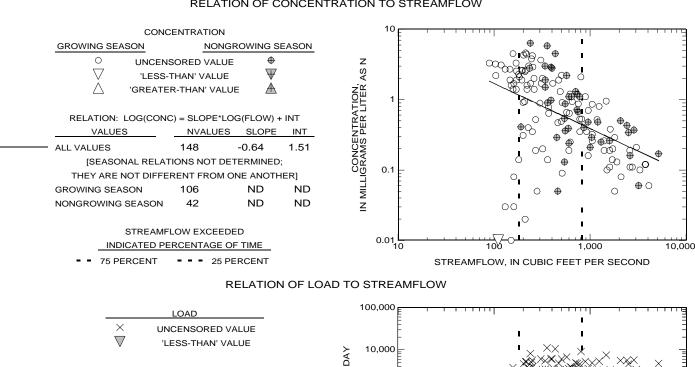
WATER YEAR

2.5

#### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT NVALUES **VALUES** SLOPE

148

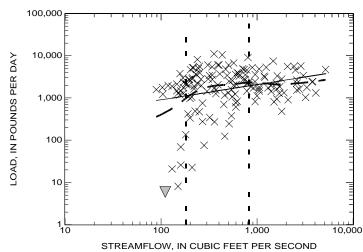
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

ALL VALUES

LOW/FLOW

STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME **75 PERCENT** 25 PERCENT

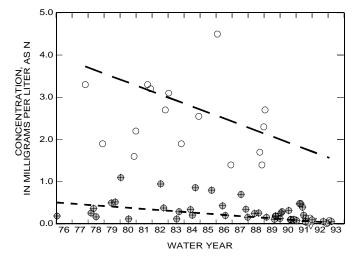
CONCENTRATION



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LUCLIELOW

_	LOW FLOW						
	O и	NCENSORE	D VALUE	<b>⊕</b>			
	▽ ,	VALUE	$\overline{\Psi}$				
	△ 'GF	REATER-THA	N' VALUE	$\blacksquare$			
	TREN	DS IN CONC	ENTRATI	ON			
	VALUES	NVALUES	NWYS	SLOPE			
	LOW FLOW	22	13	-0.142			
	HICH ELOW	11	16	-0.028			



### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCI	ENTRATION				1 F	<del> </del>			<del>                                     </del>	ш	1 1 1	ш
GROWING SEASON	NONGR	OWING SI	EASON		‡				_ 1			=
O LINCENS	ORED VALUE	<b></b>		z	‡			0	⊕ <sub>I</sub>			_
	HAN' VALUE	₩.		4S I	-				4	,		-
, ^	R-THAN' VALUE	×		÷Ω.	-			⊕ ⊕				-
△ GREATER	C-ITIAN VALUE			힌민				Δ.	<del>Ф</del> Ф •	Ф		
DELATION LOGGONO		VEL 0140		<b>₽</b> ∃			00	# ○	Ů .	Ψ		
RELATION: LOG(CONC				Ҡ╙				ф <b>ф</b>	⊕			
VALUES	NVALUES	SLOPE	INT	ΞŒ	0.1	0		~ ° ° %	) O		0	-
ALL VALUES	86	0	ND	25	ļ.	O		~ <del>**</del>			0	=
[SEASONAL RELATI	ONS NOT DET	ERMINED		δÃ	t	0	$\nabla$	O TAME			-	_
THEY ARE NOT DIFFER	RENT FROM ON	IE ANOTH	ER]	00	-		⊕ 0	V W	<b>(4)</b>			_
GROWING SEASON	53	ND	ND	CONCENTR IN MILLIGRAMS PER	-		$\nabla$		₩ .		$\overline{\Psi}$	_
NONGROWING SEASON	33	ND	ND	2			·	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	, do	Φ.	•	
				=				00	₩ .	<b>⊕</b>		-
STREAMEL	OW EXCEEDE	D							ı			
INDICATED PE					0.01	0.1	1	<del></del> 03	₱ <del>\</del> \_	100		ليو <u>ب</u> 1,000
					0.01		'		10			1,000
75 PERCENT	25 PE	RCENT				STREA	MFLOW, IN	I CUBIC FE	ET PER S	SECON	ID	
	PE	ΕΙ ΔΤΙΩΝ	IOFIC	AD TO S	TREAM	=1 (0)//						

#### RELATION OF LOAD TO STREAMFLOW

×	LOAD UNCENSORED V			>_	1000				1 1 1××	× -
RELATION: LOG( VALUES - ALL VALUES	(LOAD) = SLOPE*L0 NVALUES 86	OG(FLOW) SLOPE 0.91	+ INT INT -0.41	NDS PER DA	10			× ××, ××,	X	×
 SMOOTHED RELATION			OW	, IN POU	1		×		× × 1	-
	EAMFLOW EXCEED  ED PERCENTAGE (  NT 25 F			ГОАБ	0.01	0.1	1	×^× 10	I I 100	1,0
						STRE	AMFLOW, IN	CUBIC FEET	PER SECO	ND

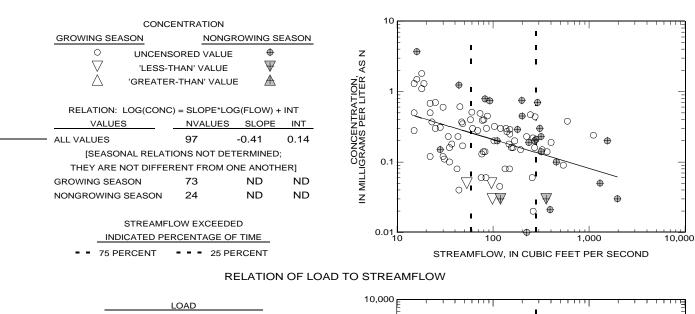
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW	CONCENTR		HIGH FLOW	J.		0.5	1	1 1	- 1	1	ı	<del>+</del>	1	1	T	ı	-	T	1	-	
, ,	NCENSOREI LESS-THAN' REATER-THA	VALUE VALUE	<b>*</b>	_	⋖	0.4	_														_
TREN VALUES	DS IN CONC	ENTRAT	ION SLOPE	ENTRA	S PER LI	0.3	_														-
LOW FLOW HIGH FLOW	0 9	0 7	ND ND	ONOO	IN MILLIGRAMS PER LITER	0.2	_		<b></b>												_
					Z Z	0.1	_			<b>+</b> +	<b>+</b>	<b>⊕</b>								7	₩
						0.0	<del>₽</del> 76 7	7 78	79	80 81	82	83 8	4 8	5 86	87	88	89	90 9	91 9	92	у 93

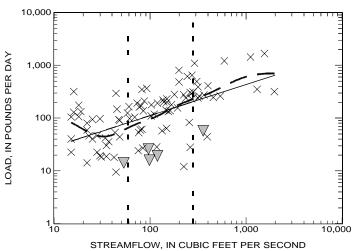
### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

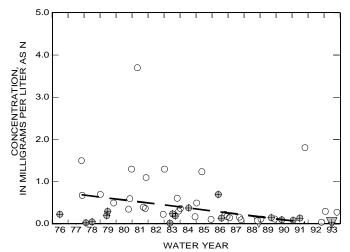
#### RELATION OF CONCENTRATION TO STREAMFLOW



	LOAD ICENSORED V .ESS-THAN' VA							
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT								
VALUES	NVALUES	SLOPE	INT					
ALL VALUES	97	0.59	0.87					
SMOOTHED RELATION BI (SHOWN IF THERE ARE 1			W					
STREAMF	STREAMFLOW EXCEEDED							
INDICATED PE	ERCENTAGE C	F TIME						
■ ■ 75 PERCENT	25 P	ERCENT						



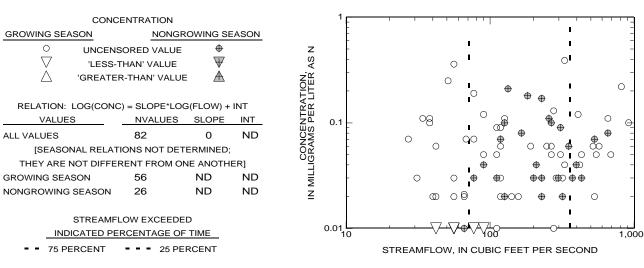
	CONCENTRATION										
LOW FLOW		HIGH FLOW									
0 0	INCENSOREI	ENSORED VALUE									
$\nabla$	▽ 'LESS-THAN' VALU										
△ 'G	△ 'GREATER-THAN' VAL										
TREN	DS IN CONC	ENTRAT	ION								
VALUES	NVALUES	NWYS	SLOPE								
— LOW FLOW	33	15	-0.047								
HIGH FLOW	16	10	ND								



### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01388000 RAMAPO RIVER AT POMPTON LAKES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	1,000 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1	<u> </u>
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT     VALUES   NVALUES   SLOPE   INT	90 × 1× × × × × × × × × × × × × × × × × ×	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	Y X X X X X X X X X X X X X X X X X X X	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT		-
	10 100 1, STREAMFLOW, IN CUBIC FEET PER SECOND	,000

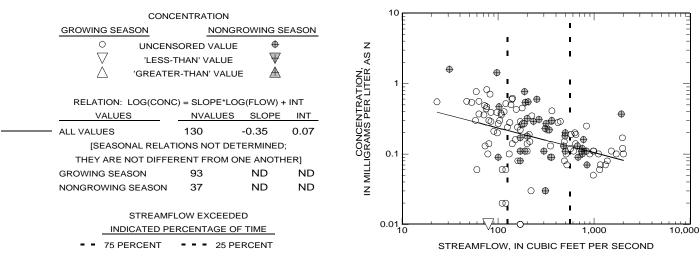
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRA	TION	C	0.5
O UNCENSORED  ☐ 'LESS-THAN' \  ☐ 'GREATER-THAN	/ALUE ₩	⋖	0.4
TRENDS IN CONCE	ENTRATION NWYS SLOPE	ENTRATI	0.3
LOW FLOW 19 HIGH FLOW 16	7 ND 5 ND	CONCENTRATION, IN MILLIGRAMS PER LITER	0.2 –
		N MIL	
		C	0.0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000 X X X X X X X X X X X X X X X X X
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  SLOPE INT  130 0.65 0.8   SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT  25 PERCENT	100 TOO TOO TOO TOO TOO TOO TOO TOO TOO T
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION	2.0	
LOW FLOW HIGH FL		
○ UNCENSORED VALUE ⊕	 	_
√ 'LESS-THAN' VALUE  √	<	
△ 'GREATER-THAN' VALUE   A  A  A  A  B  C  A  B  C  C  C  C  C  C  C  C  C  C  C  C	JON, TER,	
	50	
TRENDS IN CONCENTRATION	PERA 1.5	0
VALUES NVALUES NWYS SLOPE	ΠΩ Σσ	
LOW FLOW 39 13 NE	CONCEN IGRAMS F	_
HIGH FLOW 32 12 NE	0 R	0 0
	Ĕ	θ
	U W 0.5	
	Z	
	0.0	
	0.0	76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

2.5

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION				10 E		
GROWING SEASON	NONGR	OWING S	EASON		E	1	=
O UNCENS	ORED VALUE	<b></b>		z	+	ı ı	-
∵LESS-T	HAN' VALUE	$\forall$		AS	[		
△ 'GREATER	R-THAN' VALUE	<b>A</b>		TION, LITER,	1 0		=
RELATION: LOG(CONC	) = SLOPE*LO	G(FLOW) +	- INT	4-	Ē		=
VALUES	NVALUES	SLOPE	INT	NTR/ PER	t		_
ALL VALUES	73	0	ND	CONCE	-		-
[SEASONAL RELATI	ONS NOT DET	ERMINED	;	SA A	0.4		
THEY ARE NOT DIFFER	RENT FROM O	NE ANOTH	IER]		0.1		3
GROWING SEASON	51	ND	ND	<b>∦</b>	ŧ	0	=
NONGROWING SEASON	22	ND	ND	Z	Ŧ		=
STREAMFL INDICATED PER	OW EXCEEDE			0	0.01	1,000	10,000
75 PERCENT		RCENT			DE 4 1 4 5	STREAMFLOW, IN CUBIC FEET PER SECOND	

#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW	W)+INT
	<u>σ</u> 0.78 σ
SMOOTHED RELATION BETWEEN LOAD AND FL (SHOWN IF THERE ARE 10 OR MORE VALUES)	FLOW SO TO THE STATE OF THE STA
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	_ <sub>-</sub> _ <sub>-</sub>
	100 1,000 10,00

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

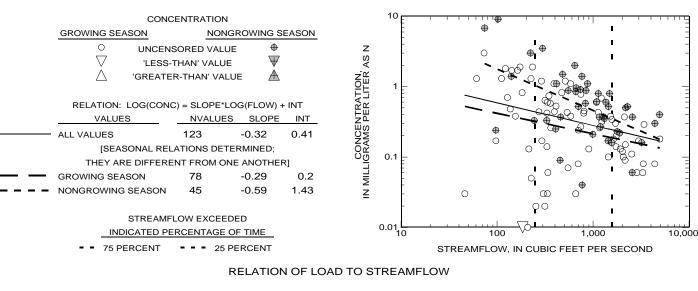
CONCENTRATION							ı	1 1	ı	1 1	ı	1	1 1	6	ı	1 1	ı	
LOW FLOW			HIGH FLOW	<u>'</u> z														
$\overline{}$	INCENSORED 'LESS-THAN'		₩	, AS	2.0	_								0				-
△ 'GI	REATER-THA	n' value	<b>A</b>	ATION, LITER														
TREN	NDS IN CONC	ENTRAT	ION	IRAT ER L	1.5									0				-
VALUES	NVALUES	NWYS	SLOPE	CONCENTRA										0				
LOW FLOW	16	6	ND	AMO MA	1.0	_								0				_
HIGH FLOW	14	4	ND	9.50 8.01														
				<u>Z</u>	0.5	_									(	٥ ر	)	
																	0	
					0.0	76 77	78 79	80 8	81 82	2 83	84 8	5 86	87	88 8	9 90	<b>91</b> <sup>∨</sup>	92	93

STREAMFLOW, IN CUBIC FEET PER SECOND

### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100,000
ALL VALUES 123 0.68 1.14	1,000
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	100 × × × 1
75 PERCENT 25 PERCENT	10 100 1,000 10,000 STREAMFLOW, IN CUBIC FEET PER SECOND

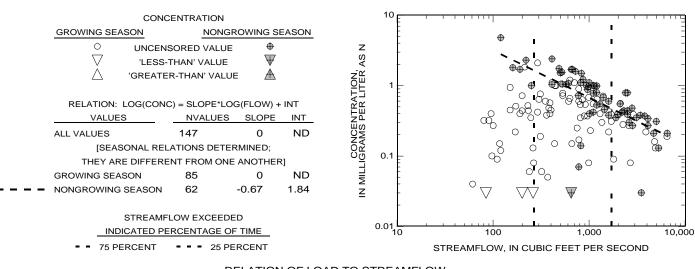
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 WATER YEAR

					10	
	CONCENTR	ATION			10	
LOW FLOW			HIGH FLOW			0
Ο υ	NCENSOREI	D VALUE	<b>⊕</b>	Z Ø	8	
$\triangle$	LESS-THAN'	VALUE	$\overline{\Psi}$	~;~	Ŭ	
△ 'GI	REATER-THA	N' VALUI	■ ▲	NO TE		0
				Ę.i.	6	=
TREN	IDS IN CONC	ENTRAT	ION	X X	-	
VALUES	NVALUES	NWYS	SLOPE	MOEN		
LOW FLOW	25	10	ND	AM	4	_
HIGH FLOW	27	12	ND	O B		
				Ē		00
				N MI	2	0000

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

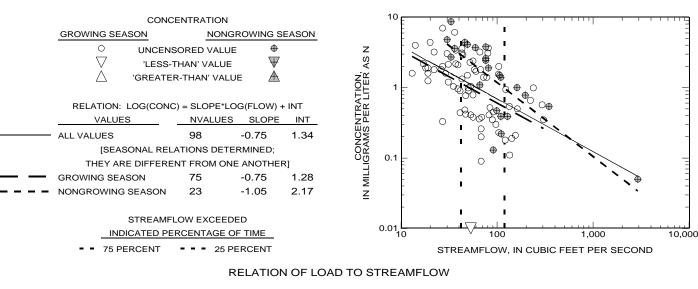
LOAD  X UNCENSORED VALUE	100,000
VIESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT           VALUES         NVALUES         SLOPE         INT           ALL VALUES         147         0.99         0.38	¥ 10,000 × × × × × × × × × × × × × × × × ×
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	99 1,000 X X X X X X X X X X X X X X X X X X
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	100
	STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

						5.0 🗖										
	CONCENTR	ATION				3.0	- 1 1	ı	1	 	ı	1		1	1	
LOW FLOW			HIGH FLOW		-											
<u> </u>	NCENSORE	D VALUE			Z S Z	4.0	-									
, ,	LESS-THAN	VALUE	$\overline{\Psi}$		Z.K.											
△ 'GF	REATER-THA	N' VALUI	E <b>A</b>		ĎΨ											
					ZZ 3	3.0	-									
TREN	DS IN CONC	ENTRAT	ION		产产											
VALUES	NVALUES	NWYS	SLOPE	į	Ä.S.					0						
LOW FLOW	31	12	ND		CONCEI GRAMS ™	2.0 -	-			Ü						
HIGH FLOW	34	14	0		OS S			8					0			
					$\exists$											
					₫ 1	1.0	- c	, 0								
					Z			$\tilde{a}$	<b>⊕</b>							

78 79 80 81 82 83 84 85 86 87 88 89 90 91 WATER YEAR [NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	10,000
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  SLOPE  INT  ALL VALUES  98  0.25  2.07  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	TOAD, IN POUNDS PER DA
75 PERCENT 25 PERCENT	10 100 1,000 10,000  STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

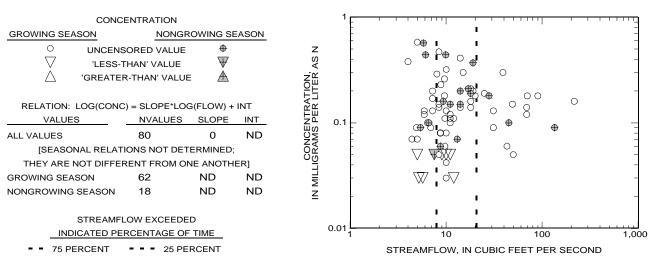
CONCENTRATION			
LOW FLOW HIGH FLOW	_		O
○ UNCENSORED VALUE ⊕	A N N	8 –	<u>-</u>
C 'LESS-THAN' VALUE			
			0
	¥.	6 –	0 _
TRENDS IN CONCENTRATION	똤		
VALUES NVALUES NWYS SLOPE	CONCENTRATION, IGRAMS PER LITER		0
LOW FLOW 30 14 0	NA NA	4 —	•
HIGH FLOW 16 11 ND	SS		0 0
	3		
	N MILL	2 –	
	≥		0 , 60
		0 76	<u> </u>
		76	7 11 10 13 00 01 02 03 04 03 00 01 00 09 90 91 92 93

WATER YEAR

### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

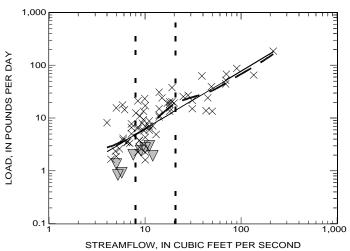
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

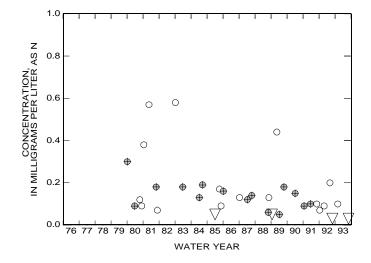


#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD				1,000
	× UNCENSORED				Ė
	V 'LESS-THAN'	VALUE		DAY	100
RELATION	: LOG(LOAD) = SLOPE*	LOG(FLOW)	+ INT	_	Ē
VALU	ES NVALUES	SLOPE	INT	PER	-
——— ALL VALUES	80	1.09	-0.29	NDS	-
— SMOOTHED F	RELATION BETWEEN LO	AD AND FLO	w	POUNDS	10
(SHOWN IF TH	HERE ARE 10 OR MORE	VALUES)		Z	E
	STREAMFLOW EXCEE	EDED		OAD	1
_IN	DICATED PERCENTAGE	OF TIME		_	Ē
<b></b> 75 l	PERCENT = = = 25	PERCENT			



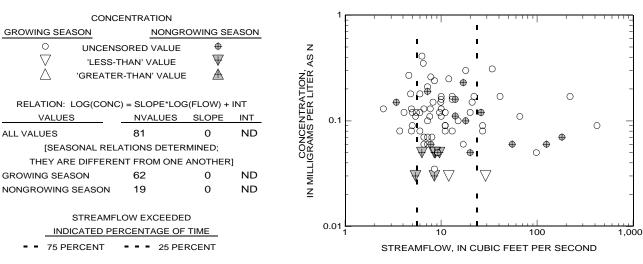
CONCENTRATION							
LOW FLOW			HIGH FLOW				
О U	NCENSORE	O VALUE	<b>⊕</b>				
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$				
△ 'GF	REATER-THA	N' VALUE	■ ▲				
TREN	DS IN CONC	ENTRAT	ION				
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	20	10	ND				
HIGH FLOW	16	11	ND				



### APPENDIX 15. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL AMMONIA 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

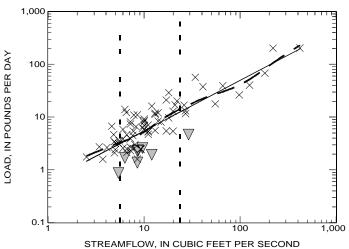
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

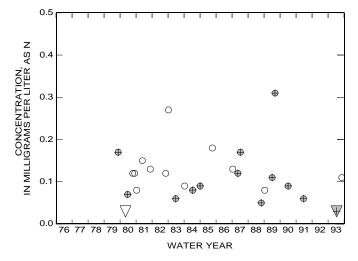


#### RELATION OF LOAD TO STREAMFLOW

					1,000	
	LOAD				1,000	
×	UNCENSORED V	ALUE			E	
$\nabla$	'LESS-THAN' VA	ALUE		>	F	
				DAY	100	
RELATION: LOG(LO	OAD) = SLOPE*LO	OG(FLOW)	+ INT	22	E	
VALUES	NVALUES	SLOPE	INT	PER	-	
 ALL VALUES	81	0.96	-0.22	SONC	-	
				Š	10	
 SMOOTHED RELATION	N BETWEEN LOAD	AND FLO	W	Ь	E	
(SHOWN IF THERE AR	E 10 OR MORE V	ALUES)		Z	-	
				OAD,		,
STREA	MFLOW EXCEED	ED		ò	1 =	
INDICATED	PERCENTAGE C	OF TIME		_	F	
<ul> <li>75 PERCENT</li> </ul>	Γ <b>= = =</b> 25 P	ERCENT			-	



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	13	9	ND
HIGH FLOW	13	11	ND



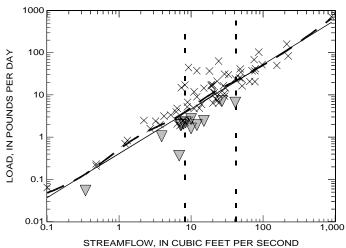
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

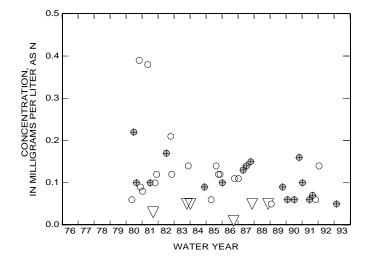
CONC	CENTRATION			1		<del>, , , , , , , , , , , , , , , , , , , </del>	
GROWING SEASON  O UNCEN  'LESS-		VING SEASO ⊕ ₩ Æ	ION, TER AS N		• • • • • • • • • • • • • • • • • • •		
RELATION: LOG(CON	,	LOW) + INT	ATRAT PER LI	.1 ⊢	8 0000 0000		
ALL VALUES [SEASONAL RELATION   SEASONAL RELAT	81	0 NI	CONCENTR GRAMS PER	5.1 F	8		
THEY ARE NOT DIFFE			_	ļ	V 🕨	₩ <del>•</del> ₩ • •	
GROWING SEASON	59 <b>N</b>	ND NI	⊒ ⊠ Z	-	$\triangle$	$\longleftarrow$	
NONGROWING SEASON	22	ND NI	Z	-	•	ı	
	LOW EXCEEDED ERCENTAGE OF TIE	ME	0.	.01	1	1 10 100	· · · · · · · · · · · · · · · · · · ·
75 PERCENT	= = 25 PERC	ENT			STREAMFLOW, IN CUI	BIC FEET PER SECONE	

#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				1000	
	×	UNCENSORED \	/ALUE			F	
	$\nabla$	'LESS-THAN' VA	ALUE		>_	100	
	RELATION: LOG(LO	DAD) = SLOPE*LO	OG(FLOW)	+ INT	R DA	Ē	
	VALUES	NVALUES	SLOPE	INT	PER	10=	
	ALL VALUES	81	1.05	-0.38	SON		
. <u>—</u>	SMOOTHED RELATION			W	N POUNDS	1	
			,		OAD, I	-	<b>&gt;</b>
		MFLOW EXCEED			9	0.1	_
		PERCENTAGE C					$\vee$
	<ul> <li>75 PERCENT</li> </ul>	= = 25 F	PERCENT			Γ.	



	CONCENTRATION						
LOW FLOW			HIGH FLOW				
O U	NCENSOREI	D VALUE	<b>⊕</b>				
,	LESS-THAN'	VALUE	$\overline{\Psi}$				
△ 'GF	REATER-THA	N' VALUE	■ ▲				
TREN	DS IN CONC	ENTRAT	ION				
VALUES	NVALUES	NWYS	SLOPE				
LOW FLOW	25	12	ND				
HIGH FLOW	17	10	ND				



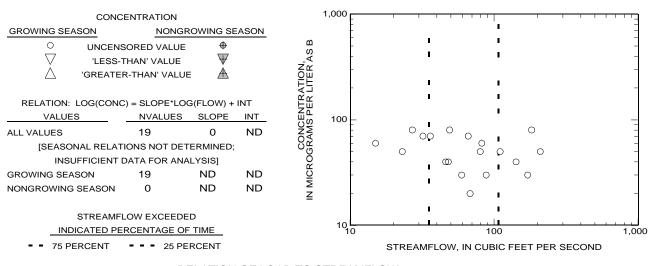
# Appendix 16 Total boron

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD		
>	UNCENSORED \	VALUE	
7	LESS-THAN' V	ALUE	
RELATION:	LOG(LOAD) = SLOPE*LO	OG(FLOW)	+ INT
VALUE	S NVALUES	SLOPE	INT
ALL VALUES	19	0.85	-0.31
SMOOTHED RE	ELATION BETWEEN LOAI	D AND FLC	W
(SHOWN IF TH	ERE ARE 10 OR MORE V	'ALUES)	
	STREAMFLOW EXCEED	DED	
IND	ICATED PERCENTAGE (	OF TIME	
75 PI	ERCENT = = 25 F	PERCENT	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

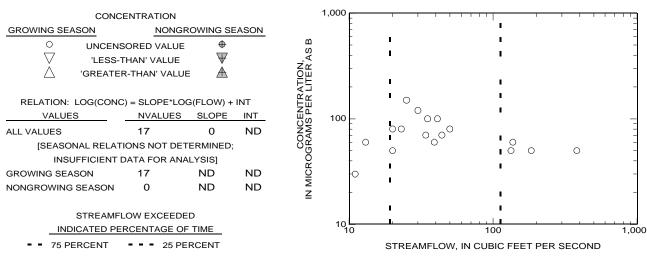
CONCENTRATION		100	00
LOW FLOW HIGH FLOW	ATION, LITER AS B	80	30 − <b>⊕</b> ○
TRENDS IN CONCENTRATION	ENTRA PER LI	60	50 <del>-</del> • • • •
VALUES         NVALUES         NWYS         SLOPE           LOW FLOW         4         3         ND           HIGH FLOW         5         5         ND	CONCENTR MICROGRAMS PER	40	⊕
	IN MICRO	20	⊕ -
	_	0	0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 9

STREAMFLOW, IN CUBIC FEET PER SECOND

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES  NVALUES  NVALUES  17  0.93  -0.32  SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENT  100  VY  O  STREAMFLOW EXCEEDED  INDICATED PERCENT  25 PERCENT  25 PERCENT	LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE		1,000	I I	
SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	· · · · · · · · · · · · · · · · · · ·	*	PER DA	1 1	
(SHOWN IF THERE ARE 10 OR MORE VALUES)  STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	ALL VALUES 17 0.93	-0.32	S F		
INDICATED PERCENTAGE OF TIME		LOW	N 10	· ××××	
	INDICATED PERCENTAGE OF TIME	<u>-</u> r	LOAD		-

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

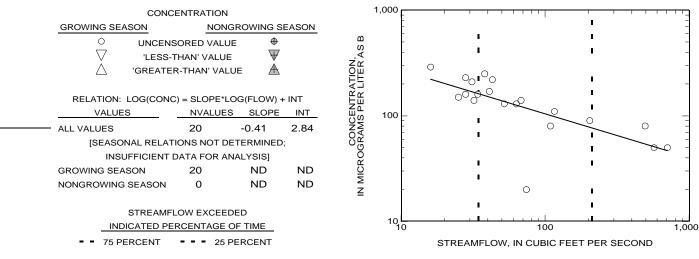
CONCENTRATION		100		ı	1 1	-	ı	ı	1	1	ı	1		1	1	
LOW FLOW         HIGH FLOW           ○         UNCENSORED VALUE         ⊕           ✓         'LESS-THAN' VALUE         ₩           ✓         'GREATER-THAN' VALUE         ★	TION, TER AS B	80 -	-													
TRENDS IN CONCENTRATION VALUES NVALUES NWYS SLOPE	S PER LI	60	-					#	Ð			<b>⊕</b>	<b>•</b>	Φ		_
LOW FLOW 2 2 ND HIGH FLOW 4 4 ND	CONCENTRATION MICROGRAMS PER LITER	40 -	-			0						•	·			_
	N MICA	20	-													=
		0	76 77 7	78 79	80	81 8	32 8	3 84	85	86	87	88	89	90 9	1 9	2 93

STREAMFLOW, IN CUBIC FEET PER SECOND

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

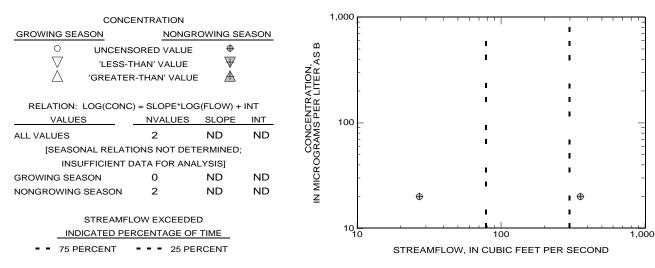
		LOAD				1,000	1 1			
	×	UNCENSORED V	ALUE			E			ī	3
	V	'LESS-THAN' VA	LUE		>	-			1 .	, -
_	RELATION: LOG( VALUES	LOAD) = SLOPE*LO NVALUES	SLOPE	INT	S PER DA`	100	1	×		
—— А	ALL VALUES	20	0.59	0.57	ğ	F	<b>X</b>	XX X	I	=
	SMOOTHED RELATIONSHOWN IF THERE A			)W	, IN POUI	10 =		`	1	-
		EAMFLOW EXCEED  ED PERCENTAGE C			LOAD	-	, ,	×	' !	- - - -
	.or Ender	201				10		100		1,000
							STREAM	FLOW, IN CUBIC FE	ET PER SECON	D

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			500	1 1	ı	1	ı	ı	1	ı	1	ı	ı	ı	1 1	1	ı	ı	
LOW FLOW	NCENSORE	D VALUE	HIGH FLOW	<u>/</u> a s	100																
$\bigvee_{\lambda}$	'LESS-THAN'	VALUE	$\overline{\Psi}$	ATION, LITER AS B	400	_															
TREN	IDS IN CONC	ENTRAT	ION	CONCENTR MICROGRAMS PER	300	_		(	0												_
VALUES	NVALUES	NWYS	SLOPE	AS AS								0									
LOW FLOW	7	7	ND	Z Z	200	_						_			0						_
HIGH FLOW	3	3	ND	966						0										С	
				CRC						0			0	(	0					_	
				M	100	_															4
				Z							4	)									
							+	₽									•	₽			
					0																
						76 77 7	78 7	9 80	81	82	83	8 84	4 8	5 8	8 8	7 88	89	90	91	92 !	93

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD		
_	$\bigvee$	UNCENSORED \ 'LESS-THAN' V		
	N: LOG(	LOAD) = SLOPE*L0 NVALUES	OG(FLOW) SLOPE	+ INT INT
LL VALUES		2	ND	ND
		ON BETWEEN LOAI RE 10 OR MORE V		W
	STRE	EAMFLOW EXCEED	DED	
	NDICATE PERCEI	<u>D PERCENTAGE (</u> NT = = = 25 F	PERCENT	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

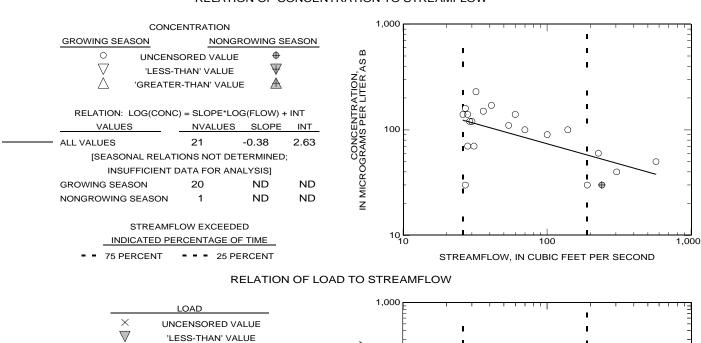
	CONCENTR	ATION				'	'	'	' '			- 1	- 1		- 1					- 1	- 1	
LOW FLOW			HIGH FLOW	В																		
٥ ر	NCENSORE	D VALUE	<b>⊕</b>	SY	20	_															) €	<b>∌</b> –
$\nabla$	LESS-THAN	VALUE	$\overline{\Psi}$	Žά																		
△ 'Gı	REATER-THA	AN' VALUE	■ ▲	ATION, LITER AS																		
				R'R L'A	15	L																_
TREN	IDS IN CONC	ENTRAT	ION	EH																		
VALUES	NVALUES	NWYS	SLOPE	ASC NO.																		
LOW FLOW	1	1	ND	CONCENTR MICROGRAMS PER	10	_																_
HIGH FLOW	1	1	ND	Oo																		
				C K																		
				Σ	5	_																_
				Z																		
					0	76 7	7 78	3 79	80	81	82	83 8	34 8	35 8	86	87	88	89	90	91	92	93
														'								

WATER YEAR

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT
VALUES NVALUES SLOPE INT

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

ALL VALUES

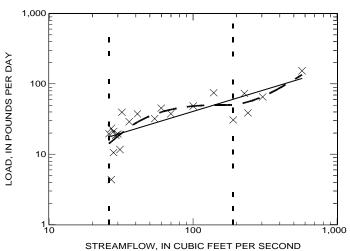
LOW FLOW

HIGH FLOW

STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

ND

ND

250

	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
٥ ر	JNCENSOREI	VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$
	REATER-THA	N' VALUE	<b>A</b>
TRE	NDS IN CONC	ENTRATI	ON
VALUES	<b>NVALUES</b>	NWYS	SLOPE

4

4

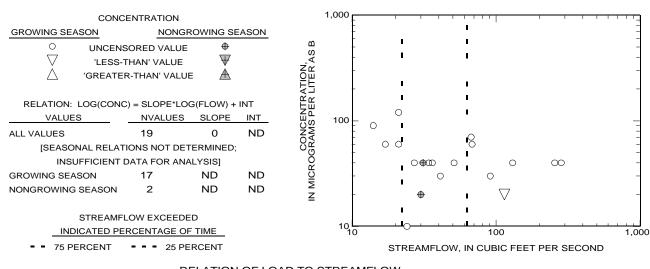
CONCENTRATION IN MICROGRAMS PER LITER	150	_			0	
IN MICROG	50 -	_	Ф Ф	<b>+</b>		

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

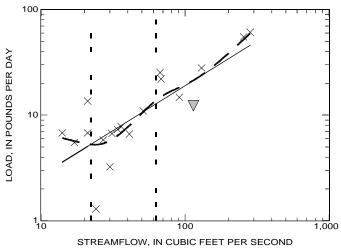


#### **RELATION OF LOAD TO STREAMFLOW**

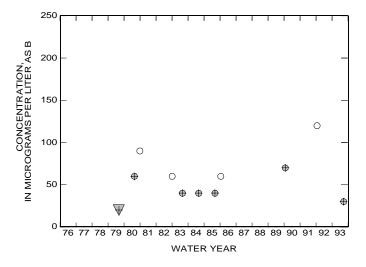
		LOAD				
	$\times$ un	ICENSORED V	ALUE			
	\(\sigma\) 'L	ESS-THAN' VA	ALUE		;	<b>-</b>
DEI ATI	ON: LOG(LOAE	)) _ SI OPE*I (	OG(ELOW)	+ INIT	Č	2
	`	,	` ,	T 1111		<u>r</u>
VAI	LUES	NVALUES	SLOPE	INT	ā	7
ALL VALUE	S	19	0.85	-0.42	() 	20 N 20 N 1
SMOOTHEE	O RELATION BE	TWEEN LOAD	O AND FLO	W	Č	รี
(SHOWN IF	THERE ARE 1	O OR MORE V	ALUES)		2	<u>z</u>
					٥	ļ
	STREAMF	LOW EXCEED	ED		(	Ď.

INDICATED PERCENTAGE OF TIME

- 75 PERCENT - - 25 PERCENT



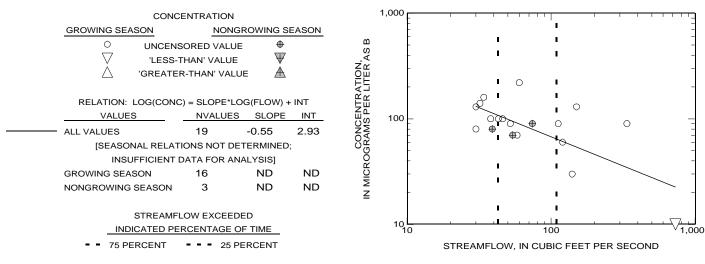
CONCENTRATION										
LOW FLOW			HIGH FLOW							
Ο υ	NCENSORE	D VALUE	<b>⊕</b>							
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$							
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$							
TREN	IDS IN CONC	ENTRAT	ION							
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	4	4	ND							
HIGH FLOW	7	7	ND							



### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				1,000	Г	<del></del>	· · · · · ·	Т	
	×	UNCENSORED V				E		ı	·		3
	V	'LESS-THAN' VA	LUE		Α	-		ı	ı		-
	RELATION: LOG	G(LOAD) = SLOPE*LO	G(FLOW)	+ INT	iR D	=		1			=
	VALUES	NVALUES	SLOPE	INT	PE	-		ī	ī	×	1
——— ALL	VALUES	19	0.45	0.67	DS				- i	^	
					S	100		ı	- ,	×	=
<del>—</del> - sм	OOTHED RELAT	ION BETWEEN LOAD	AND FLO	W	Ю	-		×		/ /	
(SH	IOWN IF THERE	ARE 10 OR MORE VA	ALUES)		Z	Ė		<del>-</del>	· ·	•	\ \
					Ó,	-		ı			$\nabla$ -
	STF	REAMFLOW EXCEED	ED		Ŏ.	-		X			-
	INDICAT	TED PERCENTAGE O	FTIME		_	-	,		, ×		_
	- 75 PERCE	ENT = = 25 PI	ERCENT				,	, ×	1		
						10		Х <b></b>			
						10 10			100		1,000
							STREA	AMFLOW, I	N CUBIC FE	EET PER SEC	OND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

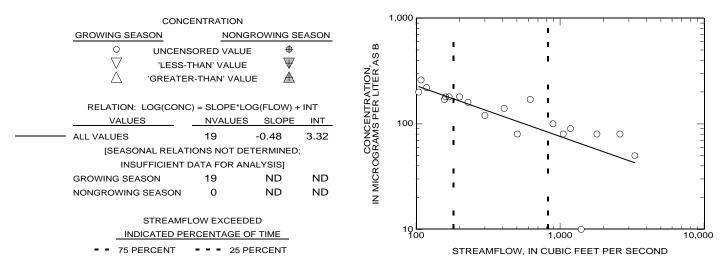
	CONCENTR	ATION			200	'	ı	1		ı	- 1	ı	I	1	1 1	ı	1	ı	1	1
LOW FLOW			HIGH FLOW	Ф																
O U	NCENSORE	D VALUE	<b>⊕</b>	YS I	200	L														
	'LESS-THAN'	VALUE	$\overline{\Psi}$	ATION, LITER AS																
△ 'GI	REATER-THA	N' VALUE	■ ▲	읟																
				RA	150	L			0	I										
TREN	IDS IN CONC	ENTRAT	ION	Ϋ́Ξ				<b>⊕</b>			0	0								
VALUES	NVALUES	NWYS	SLOPE	AS AS				Ψ				0								
LOW FLOW	6	5	ND	CONCENTR OGRAMS PER	100	L							0							_
HIGH FLOW	6	6	ND	966		<b>⊕</b>		•	₽	0									0	
				SRO															0	•
				MICR	50	L														₩
				Z													<b>⊕</b>			
															\	7	Ψ			
					0										<del>\</del>					
					_	76	77 78	3 79	80	81	82 8	33 84	85	86	87	88 8	9 9	91	92	93

WATER YEAR

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD	10,000
× UNCENSORED VALUE  "LESS-THAN' VALUE	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	1,000 × × × × × =
ALL VALUES 19 0.52 1.05	SOZ X X X
— SMOOTHED RELATION BETWEEN LOAD AND FLOW	NO X X X
(SHOWN IF THERE ARE 10 OR MORE VALUES)	100 × 1 ×
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	9
75 PERCENT 25 PERCENT	100 1,000 10,0
	'100 1,000 10,0 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTE	RATION			500	1 1	ı	1 1	ı	1 1	- 1	1	1 1		1		1	
	INCENSORE LESS-THAN REATER-THA	' VALUE	HIGH FLOW	ATION, LITER AS B	400	_												_
TDEN	IDS IN CONC	CENTRAT	ION	TRA ER 1	300	-												_
VALUES  LOW FLOW HIGH FLOW	NVALUES 6 7	NWYS 6 7	SLOPE ND ND	CONCENTR MICROGRAMS PER	200	-		0	0	0		0						0
				N N	100	_,	4	<b>,</b> ⊕		<b>⊕</b>	<b>⊕</b>				<b>+</b>	<b>⊕</b>		-
					0	76 77	78 79	80 8	81 82	83	84 8	5 86	87	⊕ı 88 :			1 92	93

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CON	CENTRATION				1,000 F	<del> </del>	
GROWING SEASON	NONG	ROWING SE	ASON		F		· -
O UNCEN	SORED VALUE	<b>+</b>		SB	F		· ]
√ 'LESS	THAN' VALUE	$\forall$		,. Y	+		I -
	R-THAN' VALU	E A		ATION, LITER A3	t		-
				£5	-		-
RELATION: LOG(CON	C) = SLOPE*LC	G(FLOW) +	INT	ER			1
VALUES	NVALUES	SLOPE	INT	E P	100 -	-	· _
ALL VALUES	1	ND	ND	CONCENTR IN MICROGRAMS PER	ŧ		
[SEASONAL RELA	TIONS NOT DE	TERMINED;		28	ţ		: =
INSUFFICIENT	DATA FOR AN	ALYSIS]		Õ	-		: -
GROWING SEASON	0	ND	ND	5	-		-
NONGROWING SEASON	1	ND	ND	Σ			
				=			•
STREAM	LOW EXCEED	ΕD			40		
INDICATED PI	ERCENTAGE O	F TIME			10 L 0.1	1 10	100
75 PERCENT	25 PI	ERCENT				STREAMFLOW, IN CUBIC FEET PE	R SECOND

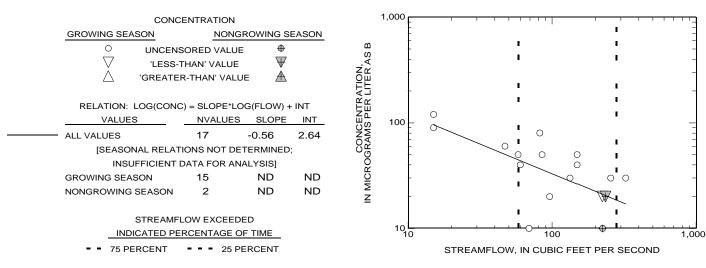
#### RELATION OF LOAD TO STREAMFLOW

	LOAD	1	F	<del></del>		<del></del>
$\overline{\mathbb{V}}$	UNCENSORED VALUE 'LESS-THAN' VALUE	× ∀				
RELATION: L VALUES	OG(LOAD) = SLOPE*LOG(FLOW) + INT  NVALUES SLOPE INT	PER DA				ı -
ALL VALUES	1 ND ND	Ω Q N O.1				1 _
	ATION BETWEEN LOAD AND FLOW RE ARE 10 OR MORE VALUES)	<u>N</u>				! !
INDIC	STREAMFLOW EXCEEDED  CATED PERCENTAGE OF TIME	LOAD,	-	$\nabla$		
75 PEF	RCENT 25 PERCENT	0.01	 D.1	1	10	100
				STREAMFLOW	, IN CUBIC FEET PER	SECOND

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

$oxed{ imes} oxed{ imes} oxed{ imes}$ UNCENSORED VALUE $oxed{ imes}$ 'LESS-THAN' VALUE	100
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW VALUES NVALUES SLOPE	V) + INT
ALL VALUES 17 0.44	0.37 80 10 × × 1
SMOOTHED RELATION BETWEEN LOAD AND FL (SHOWN IF THERE ARE 10 OR MORE VALUES)	Z -
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	Popular in the second s
	10 100 1,000 STREAMFLOW, IN CUBIC FEET PER SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

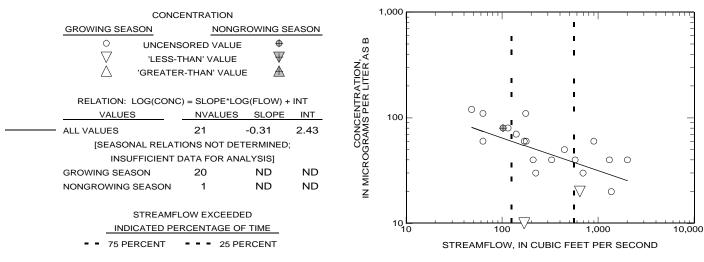
CONCENTRATION		250		1 1	1 1	1 1	- 1	1 1	'	1 1	1 1	
LOW FLOW	HIGH FLOW	<b>ω</b>										
O UNCENSORED VALUE	Φ (	S 200	_									_
'LESS-THAN' VALUE	₩ zi	2										
	± A F	Ë										
	£	_ 150	_									_
TRENDS IN CONCENTRATION	ON Z	2										
VALUES NVALUES NWYS	SLOPE 0	დ <b>∑</b>		(	0							
LOW FLOW 4 4	ND Ö	₹ 100	_									_
HIGH FLOW 1 1	ON Z SLOPE SU ND O	90					0					
						C	)					
		<u>₩</u> <u>0</u> 50	_		0		,					_
		Z								<b>⊕</b>		
		0	76 77 7	8 79 80	81 8	2 83	84 85	5 86	87 88	89 90	91 9	92 93

WATER YEAR

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD		1,000		<del></del>	<del> </del>
× UNCENSORED VALUE		E	ı		× ±
VLESS-THAN' VALUE		<u> </u>	1	ı ×	
RELATION: LOG(LOAD) = SLOPE*LOG(FLOV	i i	100 –		×	×
VALUES NVALUES SLOP	E INT	<u> </u>	Ī	$\nabla$	3
ALL VALUES 21 0.69	0.16		×××××	, i	3
SMOOTHED RELATION BETWEEN LOAD AND F	LOW	<u> </u>	<b>⋌</b>	Ī	-
(SHOWN IF THERE ARE 10 OR MORE VALUES)	<u> </u>	10	-	$\nabla$	
STREAMFLOW EXCEEDED	(	5 -	·	•	=
INDICATED PERCENTAGE OF TIME	_	<b>-</b>	-	ı	_
75 PERCENT 25 PERCEN	Т	-	I	I	-
		10	100	1,000	0 10,000
			STREAMFLOW,	IN CUBIC FEET PER	R SECOND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

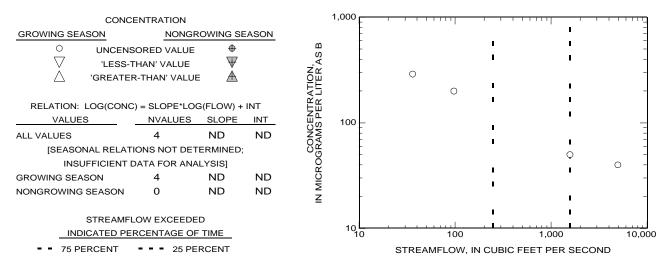
	CONCENTE	RATION			200	1 1	1 1	1	1		,	1	'	1	1 1	- 1	'	' '
LOW FLOW			HIGH FLOW	Ф														
O U	NCENSORE	D VALUE	<b>⊕</b>	1S.	200	_												_
	LESS-THAN	I' VALUE	$\overline{\Psi}$	źα														
△ 'GI	REATER-TH	an' value	$\blacksquare$	ATION, LITER AS														
				R L L A	150	_												_
TREN	IDS IN CON	CENTRAT	ON	22														
VALUES	NVALUES	NWYS	SLOPE	AS AS					0									
LOW FLOW	5	5	ND	Z AN	100	_		0										_
HIGH FLOW	7	6	ND	CONCENTR OGRAMS PER				(	0				0					
				MICR	50										0	<b>→</b>		
				≥ <u>Z</u>	50	_	Φ.		4	• •					$\oplus$			
							$\Rightarrow$									$\oplus$		
					0	76 77 7	8 70 8	0 8	1 82	83 8	34 8	5 8	3 8	7 88	3 80	an c	1 0	2 93
						, , , , ,	0 19 0	0	. 02	05 (	J- U	5 0		, 00	, 09	JU 3	. 3	_ 33

WATER YEAR

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

					0	0			
	LOAD				10,000		<del>-                                    </del>	<del> </del>	
×	UNCENSORED 'LESS-THAN' V			Α	- - -		1	! ! !	
RELATION: LOG(L	.OAD) = SLOPE*L NVALUES	OG(FLOW)	+ INT INT	PER D	1,000			I -	× _
ALL VALUES	4	ND	ND	JNDS	E			*	=
SMOOTHED RELATIO	N BETWEEN LOA	D AND FLO	w	PO	-		i	1	-
(SHOWN IF THERE AF	RE 10 OR MORE \	/ALUES)		Ž Ž	100	×	•	1	
STRE	AMFLOW EXCEE	DED		-0 A	Ė	×	i	•	=
INDICATE	D PERCENTAGE	OF TIME		_	-			ı	-
<ul> <li>75 PERCEN</li> </ul>	T 25	PERCENT			-		1	1	-
					10	100	1,	000	10,000
						STREAMFLOW,	IN CUBIC FEET I	PER SECO	ND

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

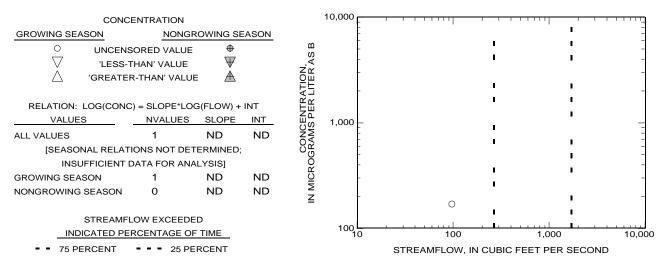
	CONCENTRATION					'	1		1	!	' '	1	1		'	- 1		ı	- 1	- 1	
LOW FLOW			HIGH FLOW	Ф																	
<u> </u>	NCENSORE	D VALUE	<u>+</u>	S <sup>A</sup>	400	_															
,	LESS-THAN'	VALUE	$\overline{\Psi}$	R,X																	
△ 'GF	REATER-THA	'N' VALUE	■ ▲	ATION, LITER,																	
				PER 1	300	_			0												_
	IDS IN CONC			N. N.					Ŭ												
VALUES	NVALUES	NWYS	SLOPE	SE																	
LOW FLOW	2	2	ND	Z Z	200	_													0		_
HIGH FLOW	1	1	ND	CONCE																	
				MICRO																	
				Σ	100	_															_
				Z																	
								$\oplus$													
					0	76 7	7 78	70 8	30 81	1 82	83	84	85	86	87	88	80	an d	11 0	12 (	33
						10 1	, , ,	13 6	0 0	1 02	. 03	04	03	00	07	00	UÐ	<b>30</b> 8	, ,	٠ ـ ١	,,,

WATER YEAR

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

						1,000			
_		LOAD				.,,,,,			' ' ' ' ' ' ' ' ' ' ' ' ' ' '
	$\times$	UNCENSORED \	/ALUE			ļ.		•	. 1
	$\nabla$	'LESS-THAN' V	ALUE			-		Ī	• -
	•	2200			≻	-			-
RELATIO	N: LOG(L	OAD) = SLOPE*L0	OG(FLOW)	+ INT	ر 7				_ =
VALU	•	NVALUES	SLOPE	INT	Ë	-			-
ALL VALUES		1	ND	ND	DS I				
ALL VALUES		'	ND	ND	Σ	100 –			I
					Ž	IOOE	X	I	3
SMOOTHED	RELATIO	N BETWEEN LOA	D AND FLC	W	P	-		i	
(SHOWN IF T	HERE AR	E 10 OR MORE V	'ALUES)		Z	Ę			. ]
					Ď.	-		•	. 4
	STRE	AMFLOW EXCEED	DED		O A	-			•
10		D PERCENTAGE (			ĭ			ı	
						<u> </u>			-
<b></b> 75	PERCEN	T = = = 25 F	PERCENT					I	ı
						10	100	1,000	10,000
							STREAMFLOW,	IN CUBIC FEET PER	SECOND

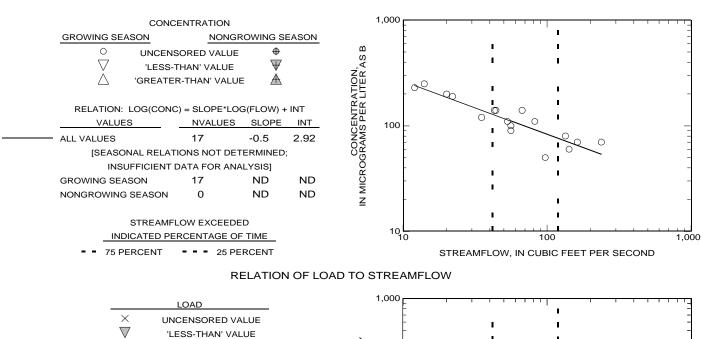
#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION  LOW FLOW  UNCENSORED VALUE  UNCENSORED VALUE  UNCENSORED VALUE  VALUE  VALUE  VALUE  VALUE  VALUE  VALUE  VALUE	1
○ UNCENSORED VALUE	
○ UNCENSORED VALUE	1
	'
V 'LESS-THAN' VALUE ₩ Ζα	
V 'LESS-THAN' VALUE ♥ Z'Œ  O U  GREATER-THAN' VALUE ★ U  E  U  O U  O U  O U  O U  O U  O U	
<b>∢</b>	_
TRENDS IN CONCENTRATION	
VALUES NVALUES NWYS SLOPE  LOW FLOW 1 1 ND ONE 100 - 1	
LOW FLOW 1 1 ND 연구 100 -	_
HIGH FLOW 0 0 ND	
$\frac{\aleph}{\aleph}$	
\tilde{\tilde{\tilde{\tilde{V}}}} \sqrt{50} \-	_
<u>Z</u>	
76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 9	2 03

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



RELATION: LOG(LOAD) = SLOPE\*LOG(FLOW) + INT

VALUES NVALUES SLOPE INT

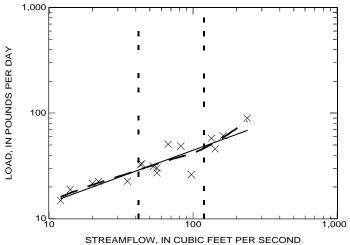
ALL VALUES 17 0.5 0.65

SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

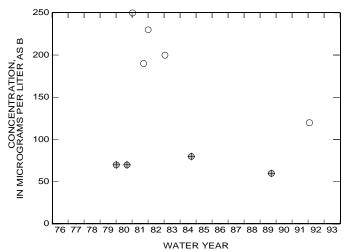
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
° ∇ Δ	UNCENSORED VALUE 'LESS-THAN' VALUE GREATER-THAN' VALU	⊕ ₩ Æ
TRI	ENDS IN CONCENTRAT	ION

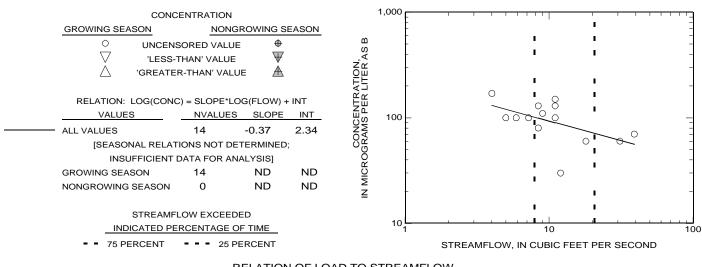
TRENDS IN CONCENTRATION									
VALUES	NVALUES	NWYS	SLOPE						
LOW FLOW	5	4	ND						
HIGH FLOW	4	3	ND						



### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

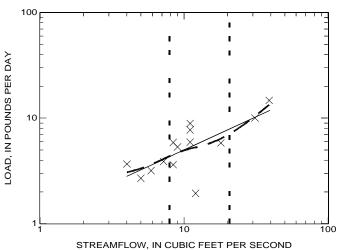
[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

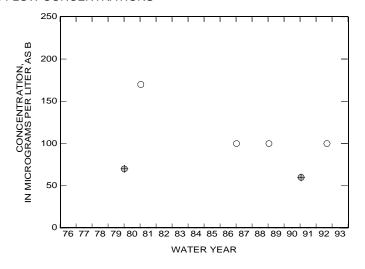


#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				100	ı		<del></del>
		ICENSORED \ .ESS-THAN' V			λΑΥ	-  -  -			
RELA	ATION: LOG(LOAI	O) = SLOPE*LO	OG(FLOW)	+ INT	_	Ī			
<u></u>	VALUES	NVALUES	SLOPE	INT	PER	-			
——— ALL VAL	UES	14	0.63	0.07	SONDO	10_			
<del></del>	HED RELATION B	ETWEEN LOAI	D AND FLO	W	PO	-			
(SHOWN	N IF THERE ARE 1	0 OR MORE V	ALUES)		Š			>	× .
	STREAM	LOW EXCEED	DED		OAD	-		ŕ	X
	INDICATED P	ERCENTAGE (	OF TIME		_	-			, ,
	75 PERCENT	= = 25 F	PERCENT						



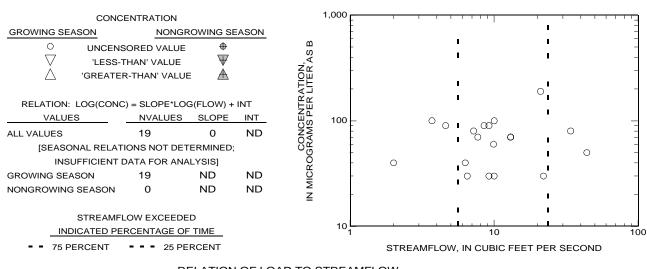
	CONCENTR	ATION	
LOW FLOW		HIGH FLOW	
O UI	NCENSORE	O VALUE	<b>⊕</b>
7	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	<b>A</b>
TREN	DS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	4	4	ND
HIGH FLOW	2	2	ND



### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

		LOAD				100 E	1 1		1 1 1	
	$\overline{\mathbb{Y}}$	UNCENSORED \ 'LESS-THAN' V			>			1 1	, , ×,	
	RELATION: LOG(L VALUES	OAD) = SLOPE*L0	OG(FLOW) SLOPE	+ INT INT	70 24	10		1		
	- ALL VALUES	19	1.06	-0.54	ν 2				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
_	SMOOTHED RELATION			)W		3		×× ×	ī	
	(SHOWN IF THERE AR		,		2	1 -		) 1	I I	
		AMFLOW EXCEED O PERCENTAGE (			-	}	×	I	ı	
	= = 75 PERCEN	T === 25 F	PERCENT			0.1	1 1	I 	I	

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

					100				_											
	CONCENTR	ATION			100		-		Ψ	1		ı	ı		ı	ı		- 1	ı	
LOW FLOW			HIGH FLOW	<u>v</u>							0									
$\bigvee_{\wedge}$	INCENSORE 'LESS-THAN' REATER-TH <i>A</i>	VALUE		ATION, LITER AS E	80	_										0				_
TDEN	NDS IN CONC	·ENTDAT	ION	INTRA PER L	60	F														_
VALUES	NVALUES	NWYS	SLOPE	III				<b>⊕</b>												
LOW FLOW	3	2	ND	SON	40	_				0										_
HIGH FLOW	2	2	ND	OGF																
				CONCI	20															
				<u>Z</u>	20															
					0	Ι.								1		ı				
					U	76	77 78	79 8	30 8	1 82	83	84	85 8	6 8	7 88	89	90 9	91 !	92	93

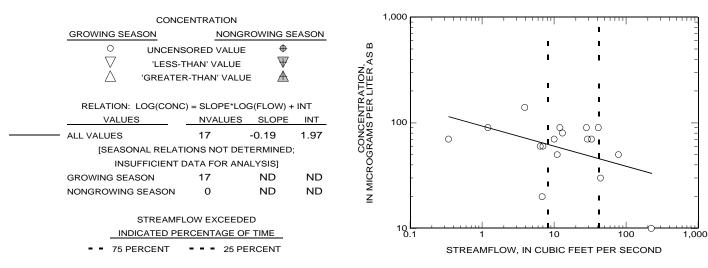
100

STREAMFLOW, IN CUBIC FEET PER SECOND

### APPENDIX 16. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL BORON 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VA  VLESS-THAN' VA		100
RELATION: LOG(LOAD) = SLOPE*LO VALUES NVALUES	G(FLOW) + INT SLOPE INT	H 10
ALL VALUES 17	0.81 -0.3	SQ.
SMOOTHED RELATION BETWEEN LOAD (SHOWN IF THERE ARE 10 OR MORE VA		NO NO NO NO NO NO NO NO NO NO NO NO NO N
STREAMFLOW EXCEEDS  INDICATED PERCENTAGE OF The Percent Telephone 1 of the		0.1

#### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

1,000

STREAMFLOW, IN CUBIC FEET PER SECOND

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

C

					250								
	CONCENTR	ATION			230		1	1	1	ı	1	ı	
LOW FLOW			HIGH FLOW	Ф									
Ο υ	NCENSORE	VALUE	<b>⊕</b>	AS E	200	_							
$\triangle$	LESS-THAN	VALUE	$\overline{\Psi}$	žχ									
△ 'GI	REATER-THA	N' VALUE	■ ▲	2일									
				RA	150	_							
TREN	IDS IN CONC	ENTRAT	ION	Ϋ́Ξ									C
VALUES	NVALUES	NWYS	SLOPE	ICE AS-									
LOW FLOW	6	6	ND	SAM	100	_							
HIGH FLOW	3	3	ND	0.49									
				Š						(	0		
				MICR	50	_			•	₽			
				Z				4	æ				

# Appendix 17 Total lead

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

### APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONG	CENTRATION	ı		100	
GROWING SEASON NONGROWING SEASON			EASON	ļ.	Ī
, LESS	SORED VALU THAN' VALU	E \pi		TER AS Pb	
RELATION: LOG(CON	C) = SLOPE*I	LOG(FLOW) +	- INT	TRA	1
VALUES	NVALUE	S SLOPE	INT	ONCENTE	•
ALL VALUES	22	0	ND	NO IMS	0
[SEASONAL RELATIONS NOT DETERMINED;				8 <u>}</u>	\tag{70\\ \tag{90\\ \tag{100\\ \tan\}\\ 100\\ \tag{100\\ \tag{100\\ \tag{100\\ \tag{100\\ \tag
INSUFFICIENT DATA FOR ANALYSIS]				Ö -	
GROWING SEASON	22	ND	ND	<u>R</u> -	•
NONGROWING SEASON	0	ND	ND	N MICRO	0 00 0
STREAMFLOW EXCEEDED				_	1 1
INDICATED PERCENTAGE OF TIME				10	100
75 PERCENT 25 PERCENT					STREAMFLOW, IN CUBIC FEET PER SECOND

100 F

#### **RELATION OF LOAD TO STREAMFLOW**

		/ALUE					
	,	LESS-THAN' VA	ALUE				
	RELATION: LOG(LOA	AD) = SLOPE*LO	OG(FLOW)	+ INT			
	VALUES	NVALUES	SLOPE	INT			
_	ALL VALUES	22	0.86	-1.44			
<ul> <li>SMOOTHED RELATION BETWEEN LOAD AND FLOW</li> </ul>							
(SHOWN IF THERE ARE 10 OR MORE VALUES)							
STREAMFLOW EXCEEDED							
INDICATED DEDOCATA OF OF THAT							

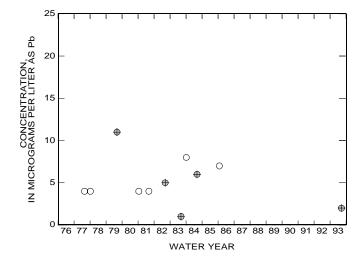
INDICATED PERCENTAGE OF TIME

75 PERCENT - - 25 PERCENT

1010

## STREAMFLOW, IN CUBIC FEET PER SECOND TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION											
LOW FLOW		HIGH FLOW									
Ο υ	NCENSORE	D VALUE	<b>+</b>								
$\nabla$	√ 'LESS-THAN' VALUE  √										
△ 'GREATER-THAN' VALUE   ⚠											
TRENDS IN CONCENTRATION											
VALUES	NVALUES	NWYS	SLOPE								
LOW FLOW	6	5	ND								
HIGH FLOW	5	5	ND								



1,000

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

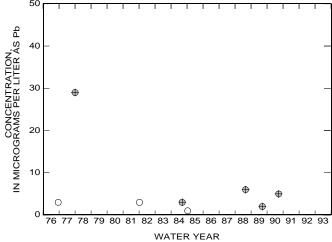
CONC	ENTRATION				100 F	1 1 1 1 1	ш	1 1 1 1	ттт т		
GROWING SEASON	NONG	ROWING S	EASON		F				1		=
O UNCENS	ORED VALUE	<b>+</b>		Pb	F			ı	1		=
√ 'LESS-T	THAN' VALUE	$\forall$		₹A	t			I	ı		-
	R-THAN' VALU	JE 🛦		ᅙ船	t				0		-
				RATION, LITER AS	+			ı	ı		-
RELATION: LOG(CONC	) = SLOPE*LO	OG(FLOW)	+ INT	H.H.				I	ı		
VALUES	NVALUES	SLOPE	INT	E P	10 –			_	ı		_
ALL VALUES	18	0	ND	CONCENTR RAMS PER	Ē				_		=
[SEASONAL RELAT	IONS NOT DE	TERMINED	);	860	ŧ			-  -	, I , IO	0	=
INSUFFICIENT [	DATA FOR AN	IALYSIS]		0	-			. 0			-
GROWING SEASON	18	ND	ND	CR	-	0	0	0 0	• 0		-
NONGROWING SEASON	0	ND	ND	N MICRO				00	. 0		
				Z							
STREAMFL	OW EXCEED	ED									
INDICATED PE	RCENTAGE C	F TIME			11		10	<del>_</del>	100		1,000
■ ■ 75 PERCENT	25 P	ERCENT				STREAM	FLOW, I	IN CUBIC FE	EET PER SEC	COND	
							,				

#### RELATION OF LOAD TO STREAMFLOW

_		LOAD		
	$\overline{}$	JNCENSORED V 'LESS-THAN' VA		
RELATIC	ON: LOG(LO	AD) = SLOPE*LO	OG(FLOW)	+ INT
VAL	UES	NVALUES	SLOPE	INT
ALL VALUES	3	18	1.33	-2.36
SMOOTHED	RELATION	BETWEEN LOAD	O AND FLO	w
(SHOWN IF	THERE ARE	10 OR MORE V	ALUES)	
	STREAM	MFLOW EXCEED	ED	
<u>_</u>	INDICATED	PERCENTAGE C	OF TIME	
75	5 PERCENT	25 P	PERCENT	

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

						50							_
	CONCENTR	ATION							1	1	1	1	
LOW FLOW			HIGH FLO	V	Pp								
٥ ر	INCENSORE	O VALUE	<b></b>			40	_						
$\nabla$	'LESS-THAN'	VALUE	$\overline{\Psi}$		A AS								
△ 'GI	REATER-THA	N' VALUE	E A										
					<b>₹</b> Ξ	30	_						
TREN	NDS IN CONC	ENTRAT	ION		I N			$\oplus$					
VALUES	NVALUES	NWYS	SLOPE		SE								
LOW FLOW	3	3	ND		CONC	20							
HIGH FLOW	5	5	ND		GR								
					RO								
					ICR	10							



STREAMFLOW, IN CUBIC FEET PER SECOND

1,000

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01379500 PASSAIC RIVER NEAR CHATHAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION			1	00 F			<del></del>
GROWING SEASON	NON	GROWING SE	ASON		ţ		I	
O LINCENS	SORED VALU	ıe 🕀		В	ţ	I	I	
	THAN' VALUE			S	+	I	7	
, A	R-THAN' VALO	- v		FR A	+		0	
△ GREATEI	X-IHAN VAL	.02 //		ĔĦ		1	ı	
RELATION: LOG(CONC	'\	OC/FLOW/	INIT	X. L.		ı	I	
VALUES	NVALUE:	, ,	INT	PENT		0 00	)	0
				ONCE AMS F	10	0 10 0		0
ALL VALUES	24	0	ND	δŞ	F	ο Q	1	O
[SEASONAL RELAT	IONS NOT D	ETERMINED;		ဝန	Ţ			
INSUFFICIENT [	DATA FOR A	NALYSIS]		õ	+	•		
GROWING SEASON	24	ND	ND	Ŗ	+	<u></u>	Ö	
NONGROWING SEASON	0	ND	ND	N MICRO		000	_	0
				Z	Ī	000	•	O
STREAMFI	OW EXCEE	DED						
INDICATED PE	RCENTAGE	OF TIME			10	100		1
·		,			. 0		EET DED	
- 75 PERCENT	25	PERCENT				STREAMFLOW, IN CUBIC F	EET PER	SECOND

#### RELATION OF LOAD TO STREAMFLOW

	LOAD				100 E	1 1			<del></del>
×	UNCENSORED V	'ALUE			F			Y	∃
$\nabla$	'LESS-THAN' VA	ALUE		<b>&gt;</b>	E	i		î	××
RELATION: LOG(L	OAD) = SLOPE*LO	G(FLOW)	+ INT	PER D/	10 –	ı		//	<del></del>
VALUES	NVALUES	SLOPE	INT	H	10	1	/		×
ALL VALUES	24	1.13	-1.77	SON	F			j	=
SMOOTHED RELATION	N BETWEEN LOAD	O AND FLC	w	Pou	-	1	× J	ı	-
(SHOWN IF THERE AR	E 10 OR MORE V	ALUES)		Z Ó	1	× ×	X	1	=
STREA	MFLOW EXCEED	ED		LOAI	Ē		×	Ī	
INDICATED	PERCENTAGE C	F TIME			-	×××		1	-
■ ■ 75 PERCEN	Γ <b>= =</b> 25 P	ERCENT			-	Ī		I	-
					0.1		100		1,0

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION			1	1	ı	'	1	'	'	'	'	'	1	'	1	1 1	- 1	ı	
LOW FLOW HIGH FLOW	Рр																		
		ю –																	_
V 'LESS-THAN' VALUE ₩	;∢ `~			<b>⊕</b>															
△ 'GREATER-THAN' VALUE 🛦 🗒	臣																		
ά 4	[ ] 3	30	_																
TRENDS IN CONCENTRATION	į.																		
VALUES NVALUES NWYS SLOPE	15																		
LOW FLOW 8 8 ND	IN MICROGRAMS PER LITER AS	20																	_
HIGH FLOW 4 4 ND	GR																		
	8						_												
	€ 1	0	0				0		#	<del>)</del>									4
	z		0		•	)		0		0		,	$\overline{}$						
	_									_	_		V			Φ.		_	
		0	70 7	7 70	70	. 00		1 00	. 00	- 0.4	Υ	- 00	, 07	. 00	100	<u> </u>	04 /	20 0	$\equiv$
		-	76 77	78	79	80	8	1 82	2 83	84	85	86	8/	88	89	90	91	92 8	13

50

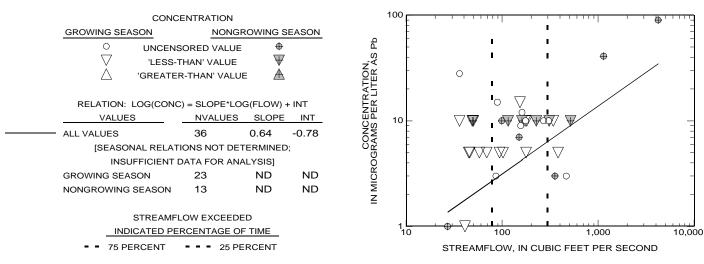
STREAMFLOW, IN CUBIC FEET PER SECOND

WATER YEAR

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01380500 ROCKAWAY RIVER ABOVE RESERVOIR, AT BOONTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD		10,000		•	1 1 1 1	777
×	UNCENSORED VALUE		F	ı	·	~	=
V	'LESS-THAN' VALUE		<b>→</b> 1000	1	1		
RELATION: LO	OG(LOAD) = SLOPE*LOG(FLOW	) + INT	PER D	ı	ı ×		=
VALUES	NVALUES SLOPE	INT	_ 100 ∟	1	ı /		
ALL VALUES	36 1.64	-3.05	SOZ		ı _/		=
	ATION BETWEEN LOAD AND FL E ARE 10 OR MORE VALUES)	ow	70 d 10 z		X		
S <u>INDIC</u>	TREAMFLOW EXCEEDED ATED PERCENTAGE OF TIME		LOAD, I		· '^		-
= = 75 PER	CENT = = = 25 PERCENT		0.1	100	1,000	)	10,000
				STREAMFLOW,	IN CUBIC FEET PER	R SECOND	

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

0

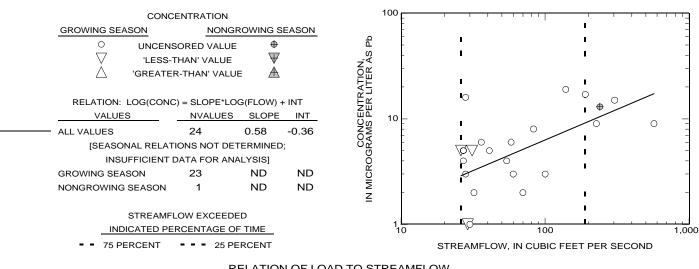
76 77 78 79 80<sup>9</sup>81 82 83 84 85 86 87 88 89 90 91 92 93 WATER YEAR

					100		
	CONCENTE	RATION			100	1 1	
LOW FLOW			HIGH FLOW	8			<b>⊕</b>
Ο υ	NCENSORE	D VALUE	Φ	S D	80	_	
$\overline{}$	LESS-THAN	' VALUE	$\overline{\Psi}$	Žά	00		
△ 'GI	REATER-TH	AN' VALUI	E A	E			
					60	_	
TREN	IDS IN CON	CENTRAT	ION	ΞË			
VALUES	NVALUES	NWYS	SLOPE	25			
LOW FLOW	10	7	ND	Ş. Ş.	40	_	<b>⊕</b>
HIGH FLOW	9	5	ND	O <sup>R</sup> O			
				MICRO			
				∑ S	20	_	
				Z			

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time 01381200 ROCKAWAY RIVER AT PINE BROOK, N.J.

[NVALUES, number of values: LOG, base-10 logarithm; CONC, concentration in indicated units: INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD	100
× UNCENSORED VALUE	
V 'LESS-THAN' VALUE	¥
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT	
VALUES NVALUES SLOPE INT	<u> </u>
ALL VALUES 24 1.58 -2.63	OUNDS .
SMOOTHED RELATION BETWEEN LOAD AND FLOW	
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Z 1
STREAMFLOW EXCEEDED	
INDICATED PERCENTAGE OF TIME	- * -
75 PERCENT 25 PERCENT	- ' <b>™</b>
	0.1 10 100 1,000
	STREAMFLOW, IN CUBIC FEET PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION					'	' '	'	'	'			I			' '	- 1	- 1	'	ı
LOW FLOW			HIGH FLOW	<del>Q</del>																	
٥ ر	NCENSORE	D VALUE	<b>⊕</b>	O,	20	L															_
$\nabla$	LESS-THAN	VALUE	$\overline{\Psi}$	Z,A																	
△ 'Gı	REATER-THA	AN' VALUE	■ ▲	CONCENTRATION, IN MICROGRAMS PER LITER A																	
				7.R/ L/	15	L		<b>⊕</b>													_
TREN	IDS IN CONC	ENTRAT	ON																	<b>⊕</b>	.
VALUES	NVALUES	NWYS	SLOPE	SS																•	
LOW FLOW	1	1	ND	Z A Z	10	_															4
HIGH FLOW	4	4	ND	96				4	<del>)</del>			<b>⊕</b>									
				Š																	
				M	5	H								7	abla						-
				Z																	
					0	76 7	77 78	8 79	80 8	1 82	2 83	84	85	86	87	88	89	90 9	91 9	2 9	3

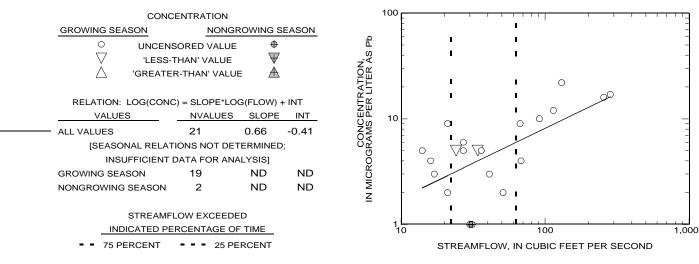
WATER YEAR

25 -

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01381500 WHIPPANY RIVER AT MORRISTOWN, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

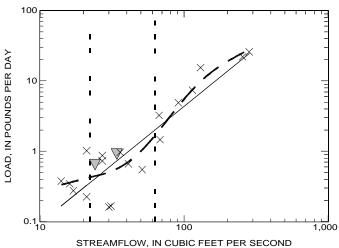
#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

_		LOAD				100 E
	× un	CENSORED V	/ALUE			F
	\( \sqrt{L} \)	ESS-THAN' VA	ALUE		,	_
					á	<b>5</b> -
RELATION	N: LOG(LOAI	D) = SLOPE*LC	OG(FLOW)	+ INT	٥	10
VALU	JES	NVALUES	SLOPE	INT	0	
ALL VALUES		21	1.66	-2.68	O C	3 [
					2	5
- SMOOTHED	RELATION B	ETWEEN LOAI	D AND FLC	W		2
(SHOWN IF T	HERE ARE 1	0 OR MORE V	ALUES)		3	<u> </u>
					ç	j E
	STREAMF	LOW EXCEED	DED		2	<b>5</b> E
	NDICATED PE	ERCENTAGE C	OF TIME		-	<b>"</b>

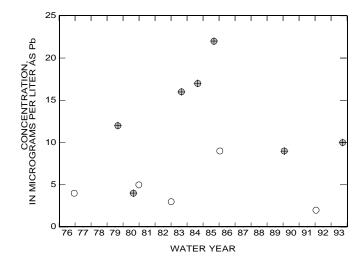
- - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION										
LOW FLOW HIGH FLOW										
Ο υ	NCENSORE	D VALUE	<b>⊕</b>							
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$							
△ 'GF	REATER-THA	N' VALUE	■ ▲							
TREN	DS IN CONC	ENTRAT	ION							
VALUES	NVALUES	NWYS	SLOPE							
LOW FLOW	5	5	ND							
HIGH FLOW	7	7	ND							

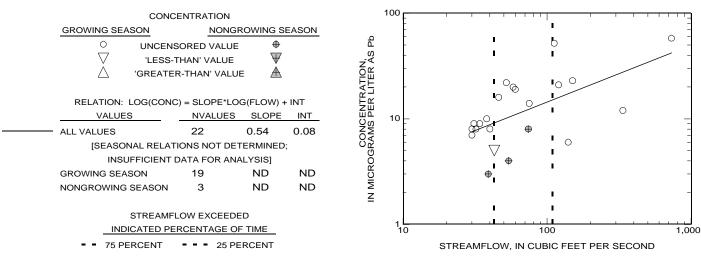
75 PERCENT



## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01381800 WHIPPANY RIVER NEAR PINE BROOK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD		1,000	<del></del>	
$\overset{\times}{\triangledown}$	UNCENSORED VALUE 'LESS-THAN' VALUE	2	- -	1 1	×
RELATION: LOG( VALUES	(LOAD) = SLOPE*LOG(FLOW NVALUES SLOPE	') + INT	100	! ! . ×	
ALL VALUES	22 1.54	-2.19	70 20 10		×//×
	ON BETWEEN LOAD AND FL .RE 10 OR MORE VALUES)	OW (			
	EAMFLOW EXCEEDED		1 T	× × '	-
= 75 PERCEI		<del>-</del>		1 1	
			0.1	100 STREAMFLOW, IN CUBIC FE	1,0 EET PER SECOND

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION					' '		'	' '	'		 '					1
LOW FLOW			HIGH FLOW	<u>-</u> 9														
$\bigvee_{\Lambda}$	INCENSORE 'LESS-THAN' REATER-THA	VALUE		TION, TER AS P	80	_											-	-
				R LI	60	_							<b>⊕</b>				-	_
	IDS IN CONC			PENT		<b>⊕</b>							•					
VALUES	NVALUES	NWYS	SLOPE	Šδ		·												
LOW FLOW	8	7	ND	CONCE	40	_											_	4
HIGH FLOW	6	6	ND	968														
				MICRO	20			<b>⊕</b>									4	è
				<u>Z</u>				<b>⊕</b>	_			0						
						0	0		0 (	o c	0	0		4	₽	0		

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

WATER YEAR

100 -

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01382000 PASSAIC RIVER AT TWO BRIDGES, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION		
GROWING SEASON	NONG	ROWING S	EASON
LESS-	SORED VALUE THAN' VALUE R-THAN' VALU	$\overline{\Psi}$	
RELATION: LOG(CONC	C) = SLOPE*LO	OG(FLOW) +	INT
VALUES	NVALUES	SLOPE	INT
ALL VALUES	22	0	ND
[SEASONAL RELAT	IONS NOT DE	TERMINED	;
INSUFFICIENT I	DATA FOR AN	IALYSIS]	
GROWING SEASON	22	ND	ND
NONGROWING SEASON	0	ND	ND
STREAMF	LOW EXCEED	ED	
INDICATED PE	RCENTAGE C	F TIME	
- 75 PERCENT	25 P	ERCENT	

#### RELATION OF LOAD TO STREAMFLOW

LOAD		1,000	<del></del>	.,	
X UNCENSORED VALUE  ▼ 'LESS-THAN' VALUE			, ! !		=
RELATION: LOG(LOAD) = SLOPE*LOG(FLO	ER DAY	100 —			
VALUES NVALUES SLOP	E INT H	100		××//	<u> </u>
ALL VALUES 22 0.93	-1.11 ON Z	-	' × '	√× ×	=
- SMOOTHED RELATION BETWEEN LOAD AND F	LOW O	×		×	-
(SHOWN IF THERE ARE 10 OR MORE VALUES)	Ö.	10	×		
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	LOA				=
	<del>_</del>		1		]
= = 75 PERCENT = = = 25 PERCEN	I		ı		
		100	1	,000	10,000

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONC	ENTRATION											' '		1
LOW FLOW		HIGH FLOW	<u>/</u>											
O UNCEN	SORED VALUE	<b></b>		40 -	_									
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$	ION, ER AS											
△ 'GREATE	R-THAN' VALU	e 🛦												
			& □	30	_					0				
TRENDS IN	CONCENTRAT	ION	ENTR PERTR							0				
VALUES NVA	UES NWYS	SLOPE	SE											
LOW FLOW 7	7	ND	CONCE	20 -	_									
HIGH FLOW 7	7	ND	GRO											
			S									•		
			IN MICRO	10	_	<b>⊕</b>	0		<b>⊕</b>			⊕ <sup>™</sup>		
			2 Z		0	(	0 0	0				*	0	
			=			<b>⊕</b>		<b>⊕</b>			$\overline{\Psi}$			

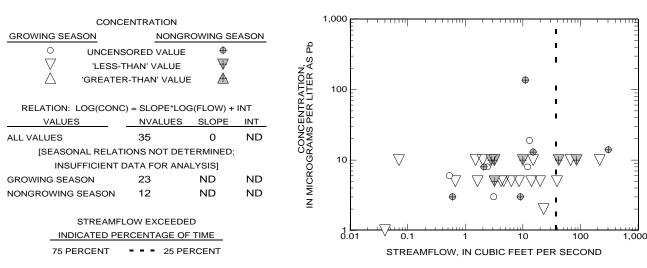
STREAMFLOW, IN CUBIC FEET PER SECOND

0 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
WATER YEAR

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01382500 PEQUANNOCK RIVER AT MACOPIN INTAKE DAM, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### RELATION OF LOAD TO STREAMFLOW

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	100 × 1
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES  NVALUES SLOPE INT  Q.5.  1.1.10 A 1.00  0	
ALL VALUES 35 1.18 -1.99 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.1
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT 25 PERCENT	0.0001
	STREAMFLOW, IN CUBIC FEET PER SECOND

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATIO	N	20		1	1 1		ı	' '	- 1		'	'			- 1	'		
LOW FLOW	HIGH FLOW	2																
O UNCENSORED VAI			L															
√	UE ₩ ZÃ	∢ Y																
△ 'GREATER-THAN' V	ALUE 🕭 🛱	ш																
	Ä.	⊒ √ 15	L															
TRENDS IN CONCENT	RATION	į			$\oplus$													
VALUES NVALUES NW	YS SLOPE O	2																
LOW FLOW 0	LUE W  ALUE M  RATION  YS SLOPE  D ND  O  ND  O  O  O  O  O  O  O  O  O  O  O  O  O	≥ 5 10	_	$\Psi$	₩.	$\overline{\Psi}$												_
HIGH FLOW 6	3 ND	<u>Y</u>		•	w	*												
		2																
	(	ິງ ₹ 5	L			$\overline{\Psi}$												_
	-	z				•												
	-	_																
		0																لب
			76 7	7 78	79	80 8	1 82	83	84	85	86	87	88	89	90	91	92	93

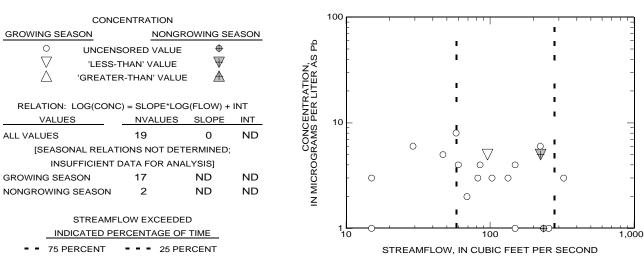
WATER YEAR

25 -

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

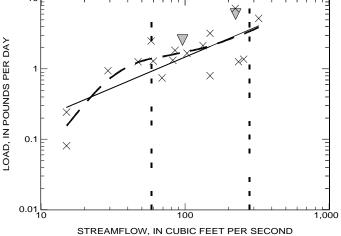
[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

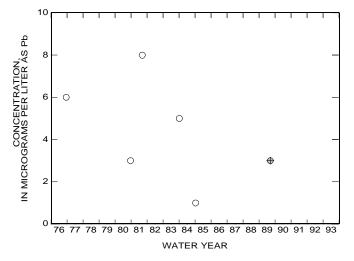


#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD				10 E
×	UNCENSORED V				Ē
٧	'LESS-THAN' VA	ALUE		λΑΥ	-
RELATION: LOG(L	.OAD) = SLOPE*LO	G(FLOW)	+ INT	ER [	1
VALUES	NVALUES	SLOPE	INT	R	' [
ALL VALUES	19	0.87	-1.57	NDS	E
- SMOOTHED RELATION	N BETWEEN LOAI	AND FLC	W	Pou	-
(SHOWN IF THERE AR	RE 10 OR MORE V	ALUES)		Z Ć	0.1
STREA	AMFLOW EXCEED	ED		-OAE	Ē
INDICATED	D PERCENTAGE C	F TIME		_	-
75 PERCEN	T = = = 25 P	ERCENT			-



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	<b>⊕</b>		
▽ ,	$\overline{\Psi}$		
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	5	5	ND
HIGH FLOW	1	1	ND



## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01388600 POMPTON RIVER AT PACKANACK LAKE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION	100
GROWING SEASON  O UNCENSORED VALUE  VILESS-THAN' VALUE  O 'GREATER-THAN' VALUE	TTER AS Pb
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	ONNO PARTY ON THE
ALL VALUES 21 0 ND [SEASONAL RELATIONS NOT DETERMINED;	S O O O
INSUFFICIENT DATA FOR ANALYSIS]	
GROWING SEASON 20 ND ND NONGROWING SEASON 1 ND ND	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME	10 100 1,000 10
75 PERCENT 25 PERCENT	STREAMFLOW, IN CUBIC FEET PER SECOND

#### RELATION OF LOAD TO STREAMFLOW

	LOAD				100 E		<del> </del>	E X
$\overset{\times}{\triangledown}$	UNCENSORED \ 'LESS-THAN' V			>	- - -	, × ,	i ×	/
	(LOAD) = SLOPE*LO	, ,		PER DA	-	×		-
VALUES ALL VALUES	NVALUES 21	SLOPE 0.96	-1.38	JNDS P		1	` /i ×	
SMOOTHED RELATION	ON BETWEEN LOAI	O AND FLO	DW .	NNOc	10	×	/*×	_
(SHOWN IF THERE A	RE 10 OR MORE V	ALUES)		, N	-	<u>//</u> ×	×	
STRE	EAMFLOW EXCEED	ED		OA	-	×//`i ×	ı	-
INDICATE	ED PERCENTAGE (	OF TIME		_	-	$\leftarrow$ $\times$	ı	-
75 PERCE	NT = = = 25 F	PERCENT				/ V X	•	
					1 10	100	1,000	10,000

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION			50			1 1	1			1	1 1			- 1	ı	
$\nabla$	UNCENSORE 'LESS-THAN' REATER-THA	D VALUE VALUE	HIGH FLOW	CONCENTRATION, IN MICROGRAMS PER LITER AS Pb	40	_							0					_
TREN VALUES	NDS IN CONC	ENTRATI	ION SLOPE	S PENT	30													_
LOW FLOW HIGH FLOW	5 7	5 6	ND ND	CONC	20	_												_
				IN MICRO	10	_	+	<b>∌</b> ○	○_ ⊕					7	Ф 7	<b>⊕</b>		=
					0	76 77	78 7	9 80 8	O 31 82	83 8	34 85	5 86	87	88	89 9	90 9	1 92	2 93

STREAMFLOW, IN CUBIC FEET PER SECOND

WATER YEAR

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	CENTRATION	
GROWING SEASON	NONGROWING	SEASON
, LESS-	SORED VALUE THAN' VALUE R-THAN' VALUE	7
RELATION: LOG(CONG	C) = SLOPE*LOG(FLOW NVALUES SLOP	•
ALL VALUES [SEASONAL RELAT	20 0 TIONS NOT DETERMINE	ND ED;
INSUFFICIENT	DATA FOR ANALYSIS]	
GROWING SEASON	13 ND	ND
NONGROWING SEASON	7 ND	ND
STREAMF	LOW EXCEEDED	
INDICATED PE	RCENTAGE OF TIME	
■ ■ 75 PERCENT	25 PERCENT	

#### RELATION OF LOAD TO STREAMFLOW

LOAD  × UNCENSORED VALUE  VLESS-THAN' VALUE	1,000			×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	S PER DA			× V = = = = = = = = = = = = = = = = = =
ALL VALUES 20 1.16 -1.77      SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)	SONDO NI	×	× ×	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  - 75 PERCENT 25 PERCENT	LOAD,	×	1	
	0.1	0 100 STREAMFLOW	1,000 , IN CUBIC FEET PER	10,000 SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

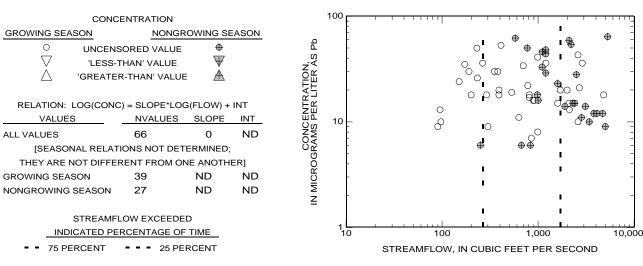
	CONCENTRA	TION			50			1 1	1 1	1 1	1	1 1			-	
$\bigvee_{\wedge}$	INCENSORED 'LESS-THAN' \ REATER-THAN	VALUE /ALUE	HIGH FLOW ⊕ ₩		40	_										_
	NDS IN CONCE			ENTRA. PER LI	30	_						<b>⊕</b>				_
LOW FLOW HIGH FLOW	NVALUES 6 4	3 3	SLOPE ND ND	CONCENTRATION,	20	_		С	)							_
				N M SO RO	10	_	•	<b>⊕</b> (	<del>*</del> 0 °			$\overline{\Psi}$			0	_
					0	76 77	78 7	9 80 8	31 82 8	33 84	85 86	87 8	8 89	90 9	1 92	2 93

WATER YEAR

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01389880 PASSAIC RIVER AT ROUTE 46 AT ELMWOOD PARK, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VA  VLESS-THAN' VAL		10,000		i	i i i ×	-
RELATION: LOG(LOAD) = SLOPE*LOG  VALUES NVALUES	(FLOW) + INT يا SLOPE INT يا			I I		
ALL VALUES 66      SMOOTHED RELATION BETWEEN LOAD A     (SHOWN IF THERE ARE 10 OR MORE VALUE)		100		× × × × × × × × × × × × × × × × × × ×	· · · · · · · · · · · · · · · · · · ·	
STREAMFLOW EXCEEDE  INDICATED PERCENTAGE OF  75 PERCENT 25 PE	D C	10		^ ×^ - ×^		
		1 <u> </u> 10	100 STREAMFLOW,	1,000		,000

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	CONCENTR	ATION				\			'	1 1	'	1	1	1	1	' '	1	'	ı	1
LOW FLOW			HIGH FLOW	P																
O U	NCENSORE	D VALUE	<b>⊕</b>		80	L														_
$\nabla$	LESS-THAN	VALUE	₩	Z,X																
△ 'GI	REATER-THA	N' VALUI	■ ▲	RATION, LITER AS																
					60	-	Ф Ф												-	4
TREN	IDS IN CONC	ENTRAT	ION			<b>⊕</b>	_													
VALUES	NVALUES	NWYS	SLOPE	NS C			0													
LOW FLOW	11	7	ND	Š	40	_		<b>⊕</b>											-	4
HIGH FLOW	22	8	ND	96			_			0				4	Φ (	0				
				S S		$\oplus$	0							0						
				CONCENTI	20	0	О Ф	0								4	<del>)</del>		-	4
				Z		\$	<b>*</b>	•			$\oplus$						<b>+</b>			
							8	<b>⊕</b>									Ψ	, 0		
					0	76	77 78	70.9	20 91	92	22 0/	1 01	5 06	97	00	90	00 0	11 0	2 01	_
						10	11 10	19 0	0001	02 (	oo 04	+ 0	000	07	00	69	90 8	, 1 9	Z 93	)

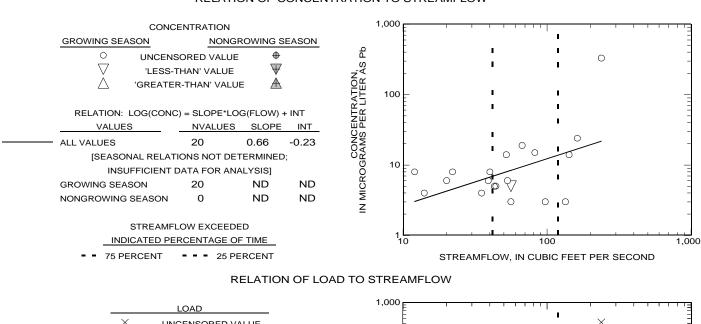
WATER YEAR

100 -

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01391500 SADDLE RIVER AT LODI, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

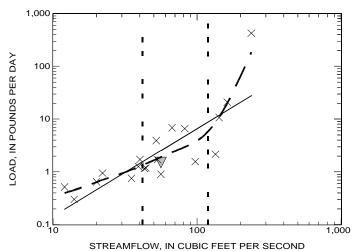


SMOOTHED RELATION BETWEEN LOAD AND FLOW (SHOWN IF THERE ARE 10 OR MORE VALUES)

STREAMFLOW EXCEEDED

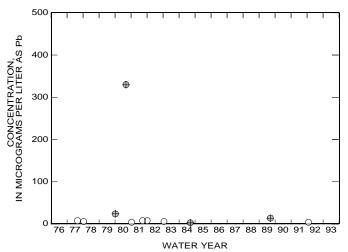
INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTRATION	
LOW FLOW		HIGH FLOW
0	UNCENSORED VALUE	<b>⊕</b>
$\nabla$	'LESS-THAN' VALUE	$\overline{\Psi}$
$\triangle$ ,	GREATER-THAN' VALU	E A

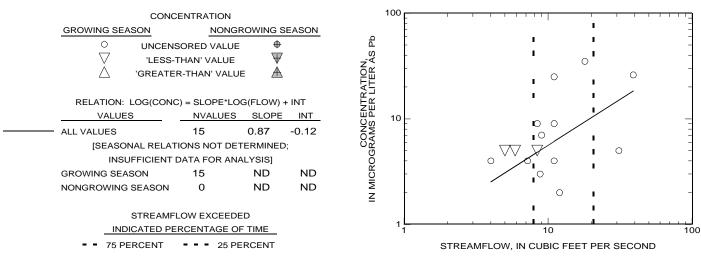
TRENDS IN CONCENTRATION											
VALUES	NVALUES	NWYS	SLOPE								
LOW FLOW	7	6	ND								
HIGH FLOW	4	3	ND								



## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01393450 ELIZABETH RIVER AT URSINO LAKE, AT ELIZABETH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

LOAD  X UNCENSORED VALUE  VLESS-THAN' VALUE	<b>∨</b>	10	, ×	×
RELATION: LOG(LOAD) = SLOPE*LOG(FLOW)           VALUES         NVALUES         SLOPE           ALL VALUES         15         1.87	INT K		× // × // × // × // × // × // × // × /	×
SMOOTHED RELATION BETWEEN LOAD AND FLO (SHOWN IF THERE ARE 10 OR MORE VALUES)	Z Z	0.1	××××××××××××××××××××××××××××××××××××××	
STREAMFLOW EXCEEDED  INDICATED PERCENTAGE OF TIME  75 PERCENT - 25 PERCENT	ГОАБ	E - - -		
		0.01	10 STREAMFLOW, IN CUBIC FEET F	100 PER SECOND

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		50		1 1	ı		1	1 1		ı		ı	1	1	
<del></del>	GH FLOW														
○ UNCENSORED VALUE  √ 'LESS-THAN' VALUE	₩ ₩ EN AS I	40	_												_
△ 'GREATER-THAN' VALUE	HIO TIO														
	R RA	30	_												_
TRENDS IN CONCENTRATION VALUES NVALUES NWYS S	Πn				<b>⊕</b>										
LOW FLOW 4 4	IN MICROGRAMS I	20	_												_
HIGH FLOW 2 2	ND GR														
	ICR.	10													
	Σ Ζ	10									_	<b>-</b>			
	_				(	)				V	\	/	<b>⊕</b>	0	
		0	76 77	78 7	79 80	81 8	2 83	84 8	85 8	6 87	7 88	89 9	90 91	92	93

WATER YEAR

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

CONC	ENTRATION				100 F	1	1 1 1		1	1 1 1 1	$\neg$
GROWING SEASON	NONGR	OWING S	SEASON		F				I		
O UNCENS	SORED VALUE	<b></b>		В	F			ı	ı		
V 'LESS-	THAN' VALUE	$\forall$		 AS	+			1	ı		
△ 'GREATE	R-THAN' VALUE	<b>A</b>		ᅙᄣ	f				0		
				ξĒ	-			1	ı		
RELATION: LOG(CONC	C) = SLOPE*LOC	(FLOW)	+ INT	F. F. F. F. F. F. F. F. F. F. F. F. F. F		0			_	0	
VALUES	NVALUES	SLOPE	INT	E E	10 –			. 0 ~	0 1		
ALL VALUES	20	0	ND	CONCENTE RAMS PER	E		0	. 0 0	_	0	
[SEASONAL RELAT	IONS NOT DET	ERMINED	<b>)</b> ;	ၓန္ထ	Ė		0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	0 0	Ŭ	
INSUFFICIENT I	DATA FOR ANA	LYSIS]		0	-						
GROWING SEASON	20	ND	ND	R	-			$\infty$			
NONGROWING SEASON	0	ND	ND	N MICRO				•			
				Z							
STREAMF	LOW EXCEEDE	D						• •			
INDICATED PE	RCENTAGE OF	TIME			11			10			
75 PERCENT	25 PE	RCENT				STREA	MFLOW	, IN CUBIC	FEET PER	R SECOND	
								,			

#### RELATION OF LOAD TO STREAMFLOW

		LOAD				10 E	1 1 1	1 1 1 1 1 1		E''''
	$\stackrel{ imes}{ riangledown}$	UNCENSORED V			<b>∀</b>	Ē		1	×i	×
	RELATION: LOG(LO	DAD) = SLOPE*LC NVALUES	OG(FLOW) SLOPE	+ INT INT	PER D,	1 _		. ×		´
	ALL VALUES	20	1.19	-1.63	NDS	<u>-</u> - -		××		
- —	SMOOTHED RELATION	N BETWEEN LOAD	AND FLO	w	PO	-	<u> </u>		i	-
	(SHOWN IF THERE AR	E 10 OR MORE V	ALUES)		Z	0.1	~ 7	<b>*</b>	Ī	_
	INDICATED	MFLOW EXCEED PERCENTAGE C	F TIME		LOAD	-		ı× ı	1	=
	75 PERCENT	「 <b></b> 25 P	ERCENT			0.01		10	<u> </u>	100

### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

Values   Noteing   Value   Value   Value   Values   Values   Noteing   Values   Values   Noteing   Values   V	CONCENTRATION  LOW FLOW  UNCENSORED VALUE  VILESS-THAN' VALUE  GREATER-THAN' VALUE	TION, TER ÅS Pb	20 -	
NO DO DO DO DO DO DO DO DO DO DO DO DO DO	VALUES NVALUES NWYS SLOPE LOW FLOW 3 2 ND	CONCENTRA	0	-
	HIGHTEOW Z Z ND	IN MICROG	0	-

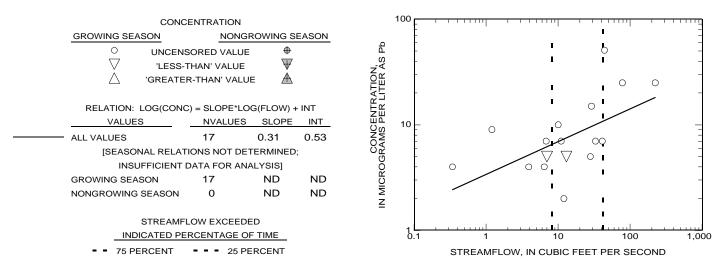
STREAMFLOW, IN CUBIC FEET PER SECOND

WATER YEAR

## APPENDIX 17. Relations of constituent concentration and load to streamflow and trends in concentration with time TOTAL LEAD 01395000 RAHWAY RIVER AT RAHWAY, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW



#### **RELATION OF LOAD TO STREAMFLOW**

	LOAD NCENSORED VALUE LESS-THAN' VALUE	_	100		1 1	          	<del></del>
RELATION: LOG(LOA VALUES	AD) = SLOPE*LOG(FLO	, i	- - - -	=	· ×		
ALL VALUES	17 1.3		1			r I	
SMOOTHED RELATION E (SHOWN IF THERE ARE		_	0.1		X <sub>1</sub> ×	1 1	
	FLOW EXCEEDED PERCENTAGE OF TIME  25 PERCE	<del></del> '	0.001		I I		1,000
			0.1	STREAMFLOW, IN	10 I CUBIC FEET	100 PER SECOND	1,000

## TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

CONCENTRATION		100	1 1	1 1 1	1 1 1	1 1	' '		1 1 1	
LOW FLOW  O UNCENSORED VALUE	HIGH FLOW □									
VILESS-THAN' VALUE  Orentary VALUE  Orentary VALUE	₩ NON NON NON NON NON NON NON NON NON NO		_							
TRENDS IN CONCENTRAT			_							-
VALUES NVALUES NWYS	ND ND	2		<b>⊕</b>						
LOW FLOW 6 6	ND ÖŞ	40	_							-
HIGH FLOW 3 3	ND 5	5								
		20		<b>⊕</b>					<b>⊕</b>	_
	<u>z</u>				0 0		0	$\nabla$	0	
		0	76 77 7	8 79 80 8	1 82 83	84 85 8	36 87	88 89	90 91 92	93

WATER YEAR

100 -

# Appendix 18 Fecal coliform bacteria

Station number	Station name
01377000	Hackensack River at Riverdale, N.J.
01379000	Passaic River near Millington, N.J.
01379500	Passaic River near Chatham, N.J.
01380500	Rockaway River above Reservoir, at Boonton, N.J.
01381200	Rockaway River at Pine Brook, N.J.
01381500	Whippany River at Morristown, N.J.
01381800	Whippany River near Pine Brook, N.J.
01382000	Passaic River at Two Bridges, N.J.
01382500	Pequannock River at Macopin Intake Dam, N.J.
01387500	Ramapo River near Mahwah, N.J.
01388600	Pompton River at Packanack Lake, N.J.
01389500	Passaic River at Little Falls, N.J.
01389880	Passaic River at Route 46, at Elmwood Park, N.J.
01391500	Saddle River at Lodi, N.J.
01393450	Elizabeth River at Ursino Lake, at Elizabeth, N.J.
01394500	Rahway River near Springfield, N.J.
01395000	Rahway River at Rahway, N.J.

## APPENDIX 18. Relations of constituent concentration and load to streamflow and trends in concentration with time FECAL COLIFORM BACTERIA 01377000 HACKENSACK RIVER AT RIVERVALE, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

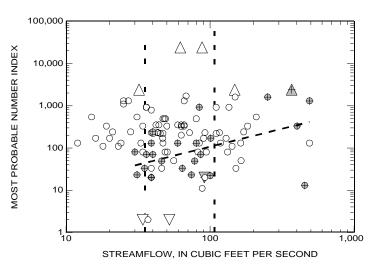
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION					
GROWING SEASON	NONGR	OWING SE	EASON		
O UNCEN	SORED VALUE	<b>Φ</b>			
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$			
△ 'GREATE	R-THAN' VALUE	$\mathbb{A}$			
RELATION: LOG(CON	C) = SLOPE*LOG	G(FLOW) +	INT		
VALUES	NVALUES	SLOPE	INT		
ALL VALUES	103	0	ND		
[SEASONAL REI	ATIONS DETER	MINED;			
THEY ARE DIFFERE	ENT FROM ONE	ANOTHER	₹]		
GROWING SEASON	78	0	ND		
 NONGROWING SEASON	25	0.85	0.33		
		_			

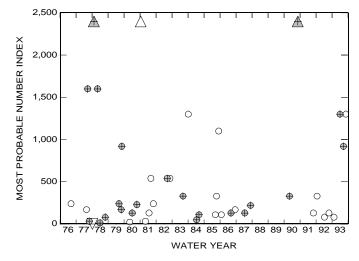
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



CONCENTRATION						
LOW FLOW			HIGH FLOW			
Ο υ	NCENSORE	O VALUE	<b>⊕</b>			
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$			
△ 'GF	REATER-THA	N' VALUE	$\blacksquare$			
TREN	DS IN CONC	ENTRAT	ION			
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	21	11	ND			
HIGH FLOW	22	11	ND			

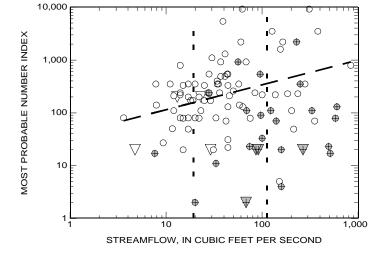


## APPENDIX 18. Relations of constituent concentration and load to streamflow and trends in concentration with time FECAL COLIFORM BACTERIA 01379000 PASSAIC RIVER NEAR MILLINGTON, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

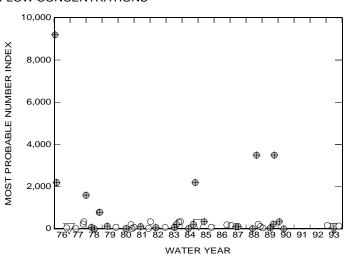
CONC	CONCENTRATION					
GROWING SEASON	NONGR	OWING SE	EASON			
O UNCENS	SORED VALUE	<b>⊕</b>				
√ 'LESS-	THAN' VALUE	$\forall$				
△ 'GREATE	R-THAN' VALUE	<u> </u>				
RELATION: LOG(CONC	RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT					
VALUES	NVALUES	SLOPE	INT			
ALL VALUES	105	0	ND			
[SEASONAL REL	ATIONS DETER	MINED;				
THEY ARE DIFFERE	THEY ARE DIFFERENT FROM ONE ANOTHER]					
GROWING SEASON	80	0.47	1.59			
NONGROWING SEASON	25	0	ND			



INDICATED PERCENTAGE OF TIME
 75 PERCENT
 25 PERCENT

STREAMFLOW EXCEEDED

CONCENTRATION					
LOW FLOW			HIGH FLOW		
Ο υ	NCENSOREI	D VALUE	<b>⊕</b>		
abla ,	LESS-THAN'	VALUE	$\overline{\Psi}$		
△ 'GF	REATER-THA	N' VALUE	■ ▲		
TREN	DS IN CONC	ENTRAT	ION		
VALUES	NVALUES	NWYS	SLOPE		
LOW FLOW	24	14	ND		
HIGH FLOW	26	15	0		



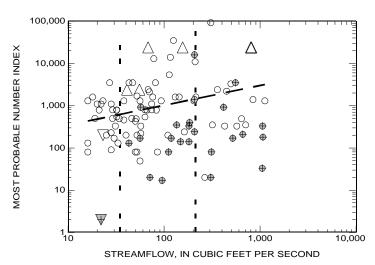
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION						
	GROWING SEASON	NONGR	OWING SE	EASON			
	O UNCENS	ORED VALUE	<b>⊕</b>				
	√ 'LESS-T	THAN' VALUE	$\forall$				
	△ 'GREATER	R-THAN' VALUE	$\blacksquare$				
	RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT						
	VALUES	NVALUES	SLOPE	INT			
	ALL VALUES	106	0	ND			
	[SEASONAL RELA	ATIONS DETER	MINED;				
	THEY ARE DIFFERE	NT FROM ONE	ANOTHER	<b>?</b> ]			
-	GROWING SEASON	81	0.47	2.07			
	NONGROWING SEASON	25	0	ND			
	0.70.5 4.451	014/51/05555	_				

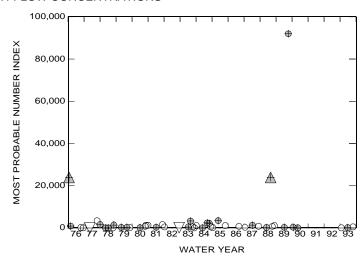
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



CONCENTRATION						
LOW FLOW	HIGH FLOW					
<u> </u>	NCENSORE	D VALUE	<b>•</b>			
	LESS-THAN	VALUE	$\forall$			
△ 'GREATER-THAN' VALUE						
TREN	IDS IN CONC	ENTRAT	ION			
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	25	14	ND			
HIGH FLOW	24	14	0			



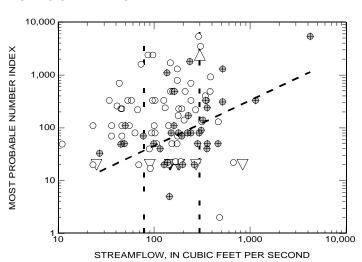
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION					
GROWING SEA	GROWING SEASON			EASON		
		RED VALUE AN' VALUE	<b>⊕</b>			
RELATION:	'GREATER-	THAN' VALUE	_	- INT		
VALUE	` ,	NVALUES	` ,	INT		
ALL VALUES		107	0	ND		
[SEAS	SONAL RELAT	IONS DETER	MINED;			
THEY AR	THEY ARE DIFFERENT FROM ONE ANOTHER]					
GROWING SEA	SON	69	0	ND		
NONGROWING	SEASON	38	0.86	-0.06		

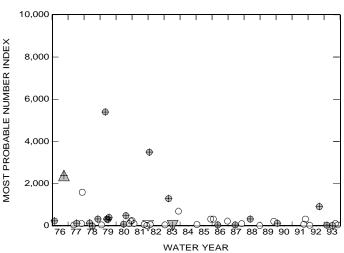
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



CONCENTRATION						
LOW FLOW			HIGH FLOW			
	NCENSOREI		<b>⊕</b> ₩/			
✓ 'LESS-THAN' VALUE ▼  'GREATER-THAN' VALUE						
<u> </u>	KEATEK-THA	IN VALUE	=			
TREN	DS IN CONC	ENTRAT	ION			
VALUES	NVALUES	NWYS	SLOPE			
LOW FLOW	26	14	0			
HIGH FLOW	22	13	0			



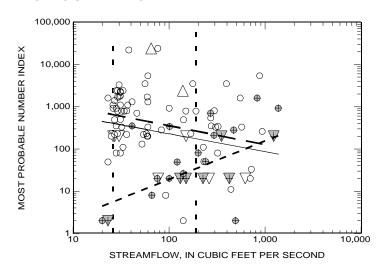
#### RELATION OF CONCENTRATION TO STREAMFLOW

CON	CONCENTRATION				
GROWING SEASON	NONGE	ROWING	SEASON		
O UNCEN	SORED VALUE	<b></b>			
√ 'LESS	-THAN' VALUE	$\forall$	7		
△ 'GREATI	ER-THAN' VALU	e 🕭	7		
RELATION: LOG(CON	IC) = SLOPE*LO	G(FLOW)	+ INT		
VALUES	NVALUES	SLOPE	INT		
ALL VALUES	103	-0.42	3.2		
[SEASONAL RE	LATIONS DETER	RMINED;			
THEY ARE DIFFER	ENT FROM ONE	ANOTHE	R]		
GROWING SEASON	80	-0.45	3.45		
NONGROWING SEASON	23	0.91	-0.54		
STREAM	FLOW EXCEEDE	D			

**75 PERCENT** 

INDICATED PERCENTAGE OF TIME

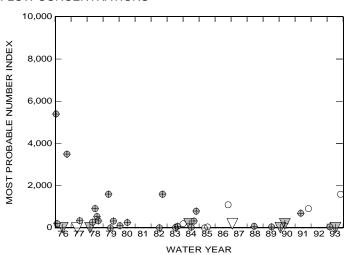
- - 25 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

LOW FLOW			HIGH FLOW
O U	NCENSORE	D VALUE	<b>⊕</b>
$\nabla$	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	IDS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	8	7	ND
HIGH FLOW	30	13	ND

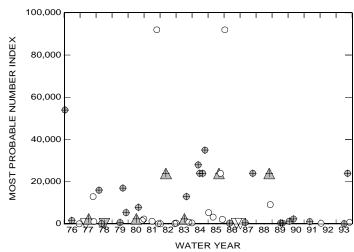
CONCENTRATION



#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION		1,000,000 -
	OWING SEASON	_ ' '
○ UNCENSORED VALUE ▽ 'LESS-THAN' VALUE △ 'GREATER-THAN' VALUE	, and the second	
RELATION: LOG(CONC) = SLOPE*LOG  VALUES NVALUES	(FLOW) + INT	10,000 - O O O O O O O O O O O O O O O O O
ALL VALUES 108  [SEASONAL RELATIONS NOT DETE		1,000
THEY ARE NOT DIFFERENT FROM ON	-	
GROWING SEASON 79 NONGROWING SEASON 29	ND ND	100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF		100 100 1,000
75 PERCENT 25 PER	CENT	STREAMFLOW, IN CUBIC FEET PER SECOND

CONCENTRATION				
LOW FLOW			HIGH FLOW	
O U	NCENSORE	VALUE	<b>⊕</b>	
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$	
△ 'GF	REATER-THA	N' VALUE	■ ▲	
TREN	DS IN CONC	ENTRAT	ION	
VALUES	NVALUES	NWYS	SLOPE	
LOW FLOW	24	12	ND	
HIGH FLOW	30	16	0	

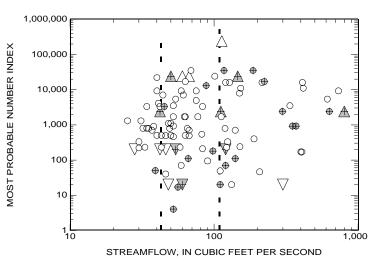


#### RELATION OF CONCENTRATION TO STREAMFLOW

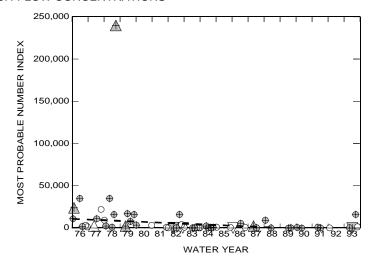
CONCE	ENTRATION		
GROWING SEASON	NONGR	OWING SE	ASON
O UNCENS	ORED VALUE	<b></b>	
√ 'LESS-T	HAN' VALUE	$\forall$	
△ 'GREATER	-THAN' VALUE	· A	
RELATION: LOG(CONC)	) = SLOPE*LOC	G(FLOW) +	INT
VALUES	NVALUES	SLOPE	INT
ALL VALUES	105	0	ND
[SEASONAL RELATI	ONS NOT DET	ERMINED;	
THEY ARE NOT DIFFER	ENT FROM ON	NE ANOTHE	ER]
GROWING SEASON	80	ND	ND
NONGROWING SEASON	25	ND	ND
STREAMFL	OW EXCEEDE	D	
INDICATED PER	RCENTAGE OF	TIME	

- - 25 PERCENT

75 PERCENT



	CONCENTRATION				
<u>L</u>	OW FLOW			HIGH FLOW	
	O UI	NCENSORE	D VALUE	Φ	
	7	LESS-THAN'	VALUE	$\overline{\Psi}$	
	△ 'GF	REATER-THA	N' VALUE	■ ▲	
	TREN	DS IN CONC	ENTRAT	ION	
	VALUES	NVALUES	NWYS	SLOPE	
	LOW FLOW	20	11	ND	
	HIGH FLOW	38	15	-819	



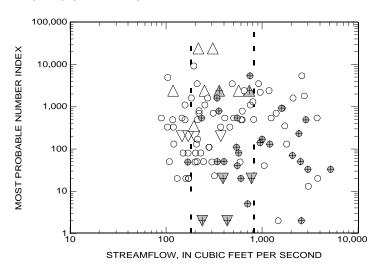
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEASON				
O UNCENSO	DRED VALUE	<b>⊕</b>		
√ 'LESS-TI	HAN' VALUE	$\forall$		
△ 'GREATER	-THAN' VALUE	$\triangle$		
RELATION: LOG(CONC)	= SLOPE*LOG	(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	105	0	ND	
[SEASONAL RELA	TIONS DETER	MINED;		
THEY ARE DIFFEREN	T FROM ONE	ANOTHER]		
GROWING SEASON	75	0	ND	
NONGROWING SEASON	30	0	ND	
STREAMFLOW EXCEEDED				

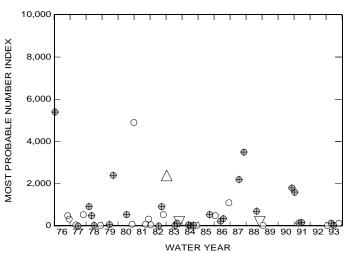
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT

75 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSOREI	D VALUE	<b>⊕</b>
$\triangle$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	20	12	ND
HIGH FLOW	27	15	0

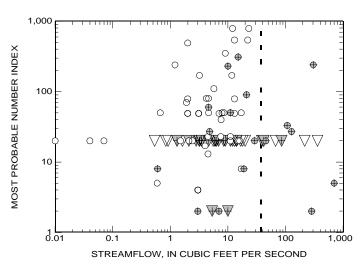


#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEAS				
O UNCENS	SORED VALUE	<b>⊕</b>		
√ 'LESS-1	ΓHAN' VALUE	$\overline{\Psi}$		
	R-THAN' VALUE	<u> </u>		
RELATION: LOG(CONC	) = SLOPE*LOG	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	104	0	ND	
[SEASONAL REL	ATIONS DETER	MINED;		
THEY ARE DIFFERE	NT FROM ONE	ANOTHER:	l	
GROWING SEASON	65	0	ND	
NONGROWING SEASON	39	0	ND	
STREAMFLOW EXCEEDED				
INDICATED PE	RCENTAGE OF	TIME		

- - 25 PERCENT

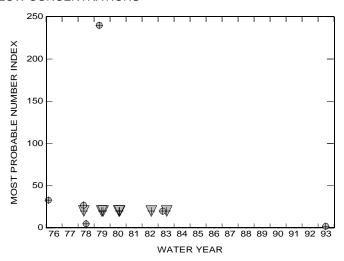
75 PERCENT



### TRENDS IN LOW- AND HIGH-FLOW CONCENTRATIONS

	00.102.111		
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	O VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	0	0	ND
HIGH FLOW	13	7	ND

CONCENTRATION



## APPENDIX 18. Relations of constituent concentration and load to streamflow and trends in concentration with time FECAL COLIFORM BACTERIA 01387500 RAMAPO RIVER NEAR MAHWAH, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

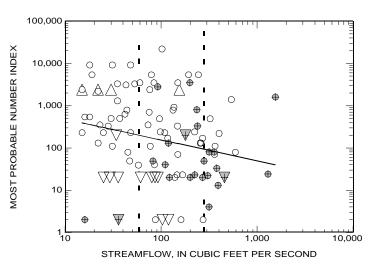
#### RELATION OF CONCENTRATION TO STREAMFLOW

CON	CONCENTRATION			
GROWING SEASON	NONGR	OWING SE	EASON	
UNCE	NSORED VALUE	<b>•</b>		
'LESS	S-THAN' VALUE	$\forall$		
△ 'GREAT	ER-THAN' VALUE	<u> </u>		
RELATION: LOG(COI	NC) = SLOPE*LO	3(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	100	-0.49	3.17	
[SEASONAL RE	ELATIONS DETER	RMINED;		
THEY ARE DIFFER	RENT FROM ONE	ANOTHER	!]	
GROWING SEASON	76	0	ND	
NONGROWING SEASON	24	0	ND	

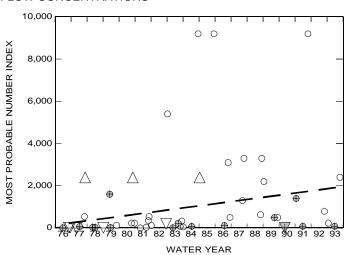
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	D VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
 LOW FLOW	35	16	101
HIGH FLOW	15	11	ND



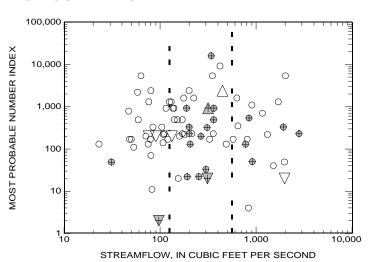
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEASON				
O UNCENS	SORED VALUE	<b></b>		
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$		
△ 'GREATE	R-THAN' VALUE	<u> </u>		
RELATION: LOG(CONC	C) = SLOPE*LOC	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	80	0	ND	
[SEASONAL RELAT	IONS NOT DET	ERMINED;		
THEY ARE NOT DIFFEI	RENT FROM ON	NE ANOTHE	ER]	
GROWING SEASON	59	ND	ND	
NONGROWING SEASON	21	ND	ND	
NONGROWING SEASON	21	ND	ND	

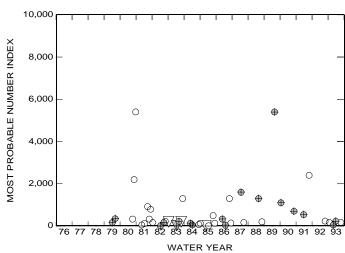
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSORE	O VALUE	<b>⊕</b>
▽ ,	LESS-THAN	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	27	12	ND
HIGH FLOW	18	11	ND



## APPENDIX 18. Relations of constituent concentration and load to streamflow and trends in concentration with time FECAL COLIFORM BACTERIA 01389500 PASSAIC RIVER AT LITTLE FALLS, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

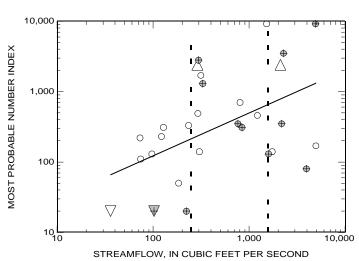
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION			
	GROWING SEASON	NONGE	ROWING SE	EASON
	O UNCENS	SORED VALUE	<b>Φ</b>	
	√ 'LESS-	THAN' VALUE	$\overline{\Psi}$	
	△ 'GREATE	R-THAN' VALUI	E A	
	RELATION: LOG(CONC	C) = SLOPE*LO	G(FLOW) +	INT
	VALUES	NVALUES	SLOPE	INT
_	ALL VALUES	29	0.61	0.87
	[SEASONAL RELAT	TONS NOT DET	TERMINED;	
	THEY ARE NOT DIFFEI	RENT FROM O	NE ANOTH	ER]
	GROWING SEASON	18	ND	ND
	NONGROWING SEASON	11	ND	ND

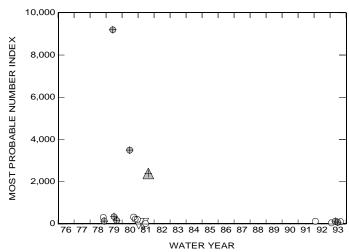
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
O U	NCENSOREI	D VALUE	<b>Φ</b>
$\nabla$ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	10	5	ND
HIGH FLOW	8	5	ND



#### RELATION OF CONCENTRATION TO STREAMFLOW

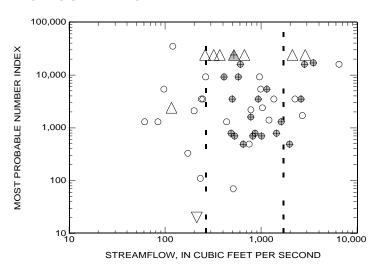
CONCENTIATION				
GROWING SEASON NONGROWING SEA				
O UNCENSO	DRED VALUE	<b>⊕</b>		
√ 'LESS-TH	HAN' VALUE	$\forall$		
△ 'GREATER-	-THAN' VALUE	<u> </u>		
RELATION: LOG(CONC)	= SLOPE*LOG	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	50	0	ND	
[SEASONAL RELATIONS NOT DETERMINED;				
THEY ARE NOT DIFFERE	ENT FROM ON	NE ANOTHE	ER]	
GROWING SEASON	30	ND	ND	
NONGROWING SEASON	20	ND	ND	

CONCENTRATION

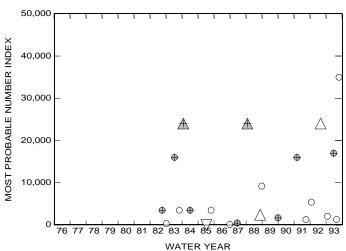
STREAMFLOW EXCEEDED

INDICATED PERCENTAGE OF TIME

75 PERCENT - 25 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
O UI	NCENSORE	D VALUE	<b>Φ</b>
7	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	13	7	ND
HIGH FLOW	9	8	ND



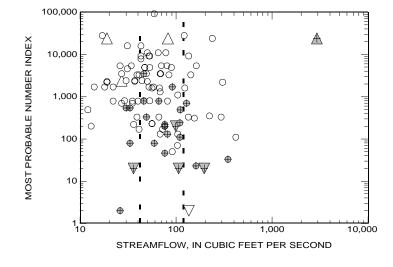
#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION				
GROWING SEASON NONGROWING SEASON				
O UNCENS	ORED VALUE	<b>⊕</b>		
√ 'LESS-T	HAN' VALUE	$\overline{\Psi}$		
△ 'GREATER	-THAN' VALUE	<u> </u>		
RELATION: LOG(CONC)	= SLOPE*LOG	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
ALL VALUES	107	0	ND	
[SEASONAL RELA	TIONS DETER	MINED;		
THEY ARE DIFFEREN	IT FROM ONE	ANOTHER:	l	
GROWING SEASON	81	0	ND	
NONGROWING SEASON	26	0	ND	
STREAMFLOW EXCEEDED				

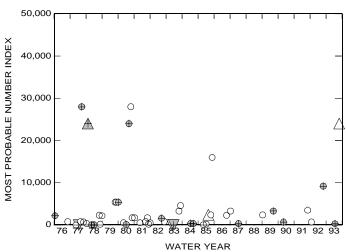
INDICATED PERCENTAGE OF TIME

- - 25 PERCENT

75 PERCENT



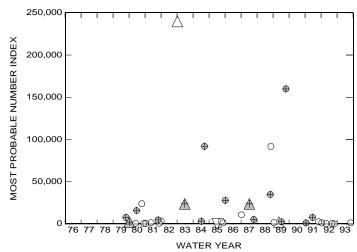
	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
Ο υ	NCENSOREI	D VALUE	<b></b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	34	15	0
HIGH FLOW	18	12	0



#### RELATION OF CONCENTRATION TO STREAMFLOW

CONCENTRATION	1,000,000
GROWING SEASON NONGROWING SEASON	
○ UNCENSORED VALUE ♥ ○ 'LESS-THAN' VALUE ▼ ○ 'GREATER-THAN' VALUE ★	100,000 DO TO TO TO TO TO TO TO TO TO TO TO TO TO
RELATION: LOG(CONC) = SLOPE*LOG(FLOW) + INT  VALUES NVALUES SLOPE INT	10,000 - 10,
———— ALL VALUES 72 0.79 2.61  [SEASONAL RELATIONS DETERMINED;  THEY ARE DIFFERENT FROM ONE ANOTHER]	1,000 O O O O O O O O O O O O O O O O O O
— GROWING SEASON 55 0.78 2.83	₩ • •
NONGROWING SEASON 17 0 ND	# 100
STREAMFLOW EXCEEDED INDICATED PERCENTAGE OF TIME	10 100 1,000
75 PERCENT 25 PERCENT	STREAMFLOW, IN CUBIC FEET PER SECOND

CONCENTRATION			
LOW FLOW			HIGH FLOW
O UI	NCENSORE	VALUE	<b>+</b>
וי 🗸	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GR	EATER-THA	N' VALUE	<b>A</b>
TREN	DS IN CONC	ENTRATI	ON
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	20	9	ND
HIGH FLOW	14	9	ND



## APPENDIX 18. Relations of constituent concentration and load to streamflow and trends in concentration with time FECAL COLIFORM BACTERIA 01394500 RAHWAY RIVER NEAR SPRINGFIELD, N.J.

[NVALUES, number of values; LOG, base-10 logarithm; CONC, concentration in indicated units; INT, intercept; FLOW, streamflow in cubic feet per second; NWYS, number of water years during which at least one measurement was made; a slope value of '0' indicates that the slope is not significantly different from zero; ND, not determined; CaCO3, calcium carbonate; C, carbon; N, nitrogen; P, phosphorus; Pb, lead; B, boron; Cl, chloride; Na, sodium; MOST PROBABLE NUMBER INDEX is per 100 milliliters]

#### RELATION OF CONCENTRATION TO STREAMFLOW

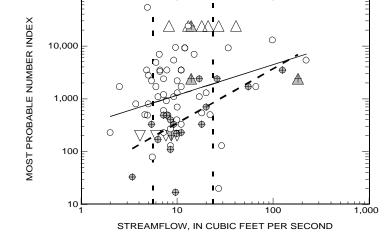
100,000

CONCENTRATION				
GROWING SEASON	NONGF	ROWING SE	EASON	
O UNCEN	SORED VALUE	Φ		
√ 'LESS-	THAN' VALUE	$\overline{\Psi}$		
△ 'GREATE	R-THAN' VALUE	■ ▲		
RELATION: LOG(CON	C) = SLOPE*LO	G(FLOW) +	INT	
VALUES	NVALUES	SLOPE	INT	
 ALL VALUES	83	0.58	2.49	
[SEASONAL REL	ATIONS DETER	RMINED;		
THEY ARE DIFFERE	ENT FROM ONE	ANOTHER	<b>?</b> ]	
GROWING SEASON	62	0	ND	
 NONGROWING SEASON	21	1.03	1.51	
STREAMF	LOW EXCEEDE	D		

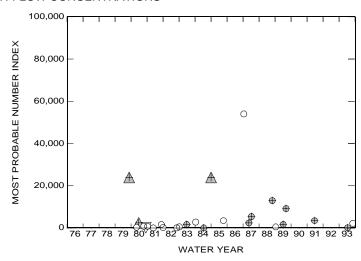
75 PERCENT

INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



	CONCENTR	ATION	
LOW FLOW			HIGH FLOW
O и	NCENSORE	D VALUE	<b>⊕</b>
▽ ,	LESS-THAN'	VALUE	$\overline{\Psi}$
△ 'GF	REATER-THA	N' VALUE	■ ▲
TREN	DS IN CONC	ENTRAT	ION
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	14	9	ND
HIGH FLOW	12	10	ND



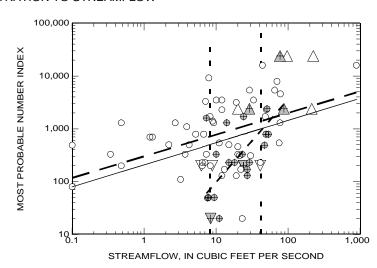
#### RELATION OF CONCENTRATION TO STREAMFLOW

	CONCENTRATION			
GROWING SEASON	100	NONGROWING SE		
, 'L	ICENSORED VAL LESS-THAN' VALU EATER-THAN' VA	JE \\		
RELATION: LOG(	CONC) = SLOPE*	LOG(FLOW) -	+ INT	
VALUES	NVALUE	S SLOPE	INT	
ALL VALUES	83	0.42	2.32	
[SEASONA	L RELATIONS DE	TERMINED;		
THEY ARE DIF	FERENT FROM C	NE ANOTHE	R]	
— GROWING SEASON	59	0.41	2.48	
NONGROWING SEAS	SON 24	1.57	0.42	
STRE	EAMFLOW EXCE	EDED		

75 PERCENT

INDICATED PERCENTAGE OF TIME

- - 25 PERCENT



CONCENTRATION			
LOW FLOW			HIGH FLOW
<u> </u>	NCENSORE	D VALUE	<u>+</u>
√ 'LESS-THAN' VALUE			
△ 'GREATER-THAN' VALUE   A  A  A  A  B  C  A  B  C  C  C  C  C  C  C  C  C  C  C  C			
TRENDS IN CONCENTRATION			
VALUES	NVALUES	NWYS	SLOPE
LOW FLOW	26	13	ND
HIGH FLOW	18	12	ND

